SELECTED WATER RESOURCES ABSTRACTS

VOLUME 4, NUMBER 19
OCTOBER 1, 1971

W71-09932 -- W71-10449

SELECTED WATER RESOURCES ABSTRACTS is published semimonthly for the Water Resources Scientific Information Center (WRSIC) by the National Technical Information Service (NTIS), U.S. Department of Commerce. NTIS was established September 2, 1970, as a new primary operating unit under the Assistant Secretary of Commerce for Science and Technology to improve public access to the many products and services of the Department. Information services for Federal scientific and technical report literature previously provided by the Clearinghouse for Federal Scientific and Technical Information will now be provided by NTIS.

SELECTED WATER RESOURCES ABSTRACTS is available to Federal agencies, contractors, or grantees in water resources upon request to: Manager, Water Resources Scientific Information Center, Office of Water Resources Research, U.S. Department of the Interior, Washington, D. C. 20240.

SELECTED WATER RESOURCES ABSTRACTS is also available on subscription from the National Technical Information Service. Annual subscription is $22 (domestic), $27.50 (foreign), single copy price $3. Certain documents abstracted in this journal can be purchased from the NTIS at prices indicated in the entry. Prepayment is required.

SELECTED
WATER RESOURCES ABSTRACTS

A Semimonthly Publication of the Water Resources Scientific Information Center,
Office of Water Resources Research, U.S. Department of the Interior

VOLUME 4, NUMBER 19
OCTOBER 1, 1971

W71-09932 -- W71-10449

Use of funds for printing this publication approved by the Director of the Bureau of the Budget, September 4, 1968.

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources."

The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States—now and in the future.

FOREWORD

Selected Water Resources Abstracts, a semimonthly journal, includes abstracts of current and earlier pertinent monographs, journal articles, reports, and other publication formats. The contents of these documents cover the water-related aspects of the life, physical, and social sciences as well as related engineering and legal aspects of the characteristics, conservation, control, use, or management of water. Each abstract includes a full bibliographical citation and a set of descriptors or identifiers which are listed in the **Water Resources Thesaurus** (November 1966 edition). Each abstract entry is classified into ten fields and sixty groups similar to the water resources research categories established by the Committee on Water Resources Research of the Federal Council for Science and Technology.

WRSIC IS NOT PRESENTLY IN A POSITION TO PROVIDE COPIES OF DOCUMENTS ABSTRACTED IN THIS JOURNAL. Sufficient bibliographic information is given to enable readers to order the desired documents from local libraries or other sources.

Selected Water Resources Abstracts is designed to serve the scientific and technical information needs of scientists, engineers, and managers as one of several planned services of the Water Resources Scientific Information Center (WRSIC). The Center was established by the Secretary of the Interior and has been designated by the Federal Council for Science and Technology to serve the water resources community by improving the communication of water-related research results. The Center is pursuing this objective by coordinating and supplementing the existing scientific and technical information activities associated with active research and investigation program in water resources.

To provide WRSIC with input, selected organizations with active water resources research programs are supported as "centers of competence" responsible for selecting, abstracting, and indexing from the current and earlier pertinent literature in specified subject areas.

Additional "centers of competence" have been established in cooperation with the Environmental Protection Agency, Water Quality Office. A directory of the Centers appears on inside back cover.

The input from these Centers, and from the 51 Water Resources Research Institutes administered under the Water Resources Research Act of 1964, as well as input from the grantees and contractors of the Office of Water Resources Research and other Federal water resources agencies with which the Center has agreements becomes the information base from which this journal is, and other information services will be, derived; these services include bibliographies, specialized indexes, literature searches, and state-of-the-art reviews.

Comments and suggestions concerning the contents and arrangements of this bulletin are welcome.

Water Resources Scientific Information Center
Office of Water Resources Research
U.S. Department of the Interior
Washington, D. C. 20240

CONTENTS

FOREWORD_____iii

SUBJECT FIELDS AND GROUPS

(Use Edge Index on back cover to Locate Subject Fields and Indexes in the journal.)

01 NATURE OF WATER
Includes the following Groups: Properties; Aqueous Solutions and Suspensions

02 WATER CYCLE
Includes the following Groups: General; Precipitation; Snow, Ice, and Frost; Evaporation and Transpiration; Streamflow and Runoff; Groundwater; Water in Soils; Lakes; Water in Plants; Erosion and Sedimentation; Chemical Processes; Estuaries.

03 WATER SUPPLY AUGMENTATION AND CONSERVATION
Includes the following Groups: Saline Water Conversion; Water Yield Improvement; Use of Water of Impaired Quality; Conservation in Domestic and Municipal Use; Conservation in Industry; Conservation in Agriculture.

04 WATER QUANTITY MANAGEMENT AND CONTROL
Includes the following Groups: Control of Water on the Surface; Groundwater Management; Effects on Water of Man's Non-Water Activities; Watershed Protection.

05 WATER QUALITY MANAGEMENT AND PROTECTION
Includes the following Groups: Identification of Pollutants; Sources of Pollution; Effects of Pollution; Waste Treatment Processes; Ultimate Disposal of Wastes; Water Treatment and Quality Alteration; Water Quality Control.

06 WATER RESOURCES PLANNING
Includes the following Groups: Techniques of Planning; Evaluation Process; Cost Allocation, Cost Sharing, Pricing/Repayment; Water Demand; Water Law and Institutions; Nonstructural Alternatives; Ecologic Impact of Water Development.

07 RESOURCES DATA
Includes the following Groups: Network Design; Data Acquisition; Evaluation, Processing and Publication.

08 ENGINEERING WORKS
Includes the following Groups: Structures; Hydraulics; Hydraulic Machinery; Soil Mechanics; Rock Mechanics and Geology; Concrete; Materials; Rapid Excavation; Fisheries Engineering.

09 MANPOWER, GRANTS, AND FACILITIES
Includes the following Groups: Education—Extramural; Education—In-House; Research Facilities; Grants, Contracts, and Research Act Allotments.

10 SCIENTIFIC AND TECHNICAL INFORMATION
Includes the following Groups: Acquisition and Processing; Reference and Retrieval; Secondary Publication and Distribution; Specialized Information Center Services; Translations; Preparation of Reviews.

SUBJECT INDEX

AUTHOR INDEX

ORGANIZATIONAL INDEX

ACCESSION NUMBER INDEX

ABSTRACT SOURCES

SELECTED WATER RESOURCES ABSTRACTS

01. NATURE OF WATER

1B. Aqueous Solutions and Suspensions

NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
Union Carbide Corp., Tuxedo, N.Y. Sterling Forest Research Center.
G. J. Safford, P. S. Leung, and S. M. Sanborn.
For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Price $0.70. Office of Saline Water Research and Development Progress Report No. 590, September 1970. 78 p, 14 fig, 5 tab, 45 ref. OSW Contract 14-01-0001-1484.

Descriptors: *Water structure, *Saline water systems, *Aqueous solutions, *Hydrates, Desalination, Thermodynamics, Electrolytes, Physicochemical properties, Ions, Analytical techniques, Chemical analysis.
Identifiers: *Water structure, Neutron inelastic scattering.

Intermolecular frequencies below 900cm-1 of H2O molecules in water and aqueous solutions of a number of salts have been measured by slow neutron inelastic scattering (NIS). The effects of strongly hydrating anions have been studied to obtain information on anion hydration and its effect on the cation hydration. The different components contributing to the diffusive motions in ionic solutions and their relationship to glass formation have been investigated. Studies on single salt solutions have been extended to study the changes in the hydration of ions and in the associated diffusive kinetics of H2O molecules that occur upon the mixing of two solutions. The results of this work have been related to the influence of ions on the structure of water, the existence and nature of hydrated species in electrolytic solutions, and the corresponding changesin diffusive kinetics of H2O molecules caused by ions. (Brooks - Office of Saline Water)
W71-09974

'POLYWATER' AND SWEAT: SIMILARITIES BETWEEN THE INFRARED SPECTRA,
Bell Telephone Labs., Murray Hill, N.J.
D. L. Rousseau.
Science, Vol 171, No 3967, p 170-172, January 15, 1971. 3 p, 1 fig, 11 ref.

Descriptors: *Water properties, *Water chemistry, *Aqueous solutions, *Sweat, *Organic matter, Ions, Spectroscopy, Water structure, Chemical analysis, Water analysis, Chemical properties, Density, Electrolytes, Hydrogen bonding, Physical properties, Viscosity.
Identifiers: *Polywater, *Anomalous water, *Infrared spectroscopy, Sweat.

The infrared spectrum of 'polywater' is remarkably similar to that of sodium lactate, the primary constituent of sweat. It is proposed, therefore, that this property of 'polywater,' and possibly others, results from accidential biological contamination. Such contamination is consistent with chemical analyses of 'polywater' samples prepared both here and abroad. (Knapp-USGS)
W71-10322

02. WATER CYCLE

2A. General

QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
Utah Water Research Lab., Logan.
For primary bibliographic entry see Field 05B.
W71-09936

INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
Agricultural Research Service, Tucson, Ariz. Southwest Watershed Research Center.
L. J. Lane, M. H. Diskin, and K. G. Renard.
Journal of Hydrology, Vol 13, No 1, p 22-40, Apr 1971. 19 p, 9 fig, 3 tab, 13 ref.

Descriptors: *Ephemeral streams, *Routing, *Hydrograph analysis, *Input-output analysis, *Rainfall-runoff relationships, Hydrographs, Arizona, Mathematical models, Systems analysis, Regression analysis, Alluvial channels, Streamflow forecasting, Flood forecasting.
Identifiers: *Walnut Gulch Experimental Watershed (Ariz).

A method was developed to predict outflow hydrographs for a specific reach of ephemeral stream channel on the Walnut Gulch Experimental Watershed in southeastern Arizona. The volume and peak discharges of the outflow hydrographs were predicted from the volumes of the inflow hydrographs. A three-parameter gamma distribution function was used to represent the inflow and outflow hydrographs. Two methods were used to fit the gamma distribution to the shape of the outflow hydrograph. Regression equations were developed to relate the parameters of the outflow distribution to the parameters of the inflow distribution graph. Best results were obtained when both the inflow and outflow hydrographs were single-peaked. (Knapp-USGS)
W71-10014

THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
Hydrological Research Unit. Wallingford (England).
R. T. Clarke.
Journal of Hydrology, Vol 13, No 1, p 91-95, Apr 1971. 5 p, 10 ref.

Descriptors: *Stochastic processes, *Parametric hydrology, *Mathematical models, *Linear programming, *Model studies, Systems analysis, Input-output analysis, Statistical models, Statistical methods.
Identifiers: *Linearity (Mathematical).

The terms used in hydrology, as in other sciences, must be capable of exact definition if ambiguity is to be avoided; two examples suggest that linearity in the systems-theory sense is not necessarily equivalent to linearity in the statistical sense. Unless the sense of the term 'linear' is carefully distinguished, there is a possibility that the stochastic hydrologist and the parametric hydrologist may misunderstand each other. (Knapp-USGS)
W71-10020

COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
Agricultural Research Service, Beltsville, Md. Hydrograph Lab.
C. B. England, and M. J. Coates.
Water Resources Bulletin, Vol 7, No 3, p 421-427, Jun 1971. 7 p, 4 fig, 7 ref.

Descriptors: *Water balance, *Mathematical models, *Hydrologic budget, *Lysimeters, Soil water, Evapotranspiration, Water conversation, Water utilization, Consumptive use, Computer programs, Water storage.
Identifiers: Coshocton (Ohio).

A comprehensive mathematical watershed model containing a complete soil moisture accounting system was used to simulate the hydrologic processes measured in one of the weighing lysimeters at Coshocton, Ohio. Data from a four-year rotation were used to evaluate the predictions. Reasonable agreement was obtained between observed and predicted percolation and evapotranspiration values. (Knapp-USGS)
W71-10021

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
Agricultural Research Service, Tucson, Ariz. Southwest Watershed Research Center.
H. B. Osborn, L. J. Lane, and R. S. Kagan.
Water Resources Bulletin, Vol 7, No 3, p 484-494, Jun 1971. 11 p, 4 fig, 1 tab, 7 ref.

Descriptors: *Rainfall-runoff relationships, *Runoff forecasting, *Parametric hydrology, *Mathematical models, *Computer programs, Storm runoff, Regression analysis, Variability, Arizona.
Identifiers: *Experimental watersheds.

Significant parameters for predicting thunderstorm runoff from small semiarid watersheds are determined using data from the Walnut Gulch watershed in southern Arizona. Thunderstorm rainfall is dominant over watershed parameters for predicting runoff from multiple linear regression equations. In some cases antecedent moisture added significantly to the models. A technique was developed for estimating precision of predicted values from multiple linear regression equations. The technique involves matrix methods in estimating the variance of mean predicted values from a regression equation. The estimated variance of the mean predicted value is used to estimate the variance of an individual predicted value. A computer program was developed to implement these matrix methods and to form confidence limits on predicted values on both a normality assumption and the Chebyshev inequality. (Knapp-USGS)
W71-10027

SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
Agricultural Research Service, University Park, Penn. Northeast Watershed Research Center.
Edwin T. Engman, William J. Gburek, Leslie H. Parmele, and James B. Urban.
Water Resources Bulletin, Vol 7, No 3, p 495-505, Jun 1971. 11 p, 6 fig, 2 tab, 21 ref.

Descriptors: *Surveys, *Investigations, *Planning, Rainfall-runoff relationships, Hydrogeology, Surface-groundwater relationships, Hydrology, Geology, Meteorology, Surface waters, Water quality.
Identifiers: *Water resources investigations.

The problems encountered in estimating scale parameters in interdisciplinary watershed research are reviewed. Meteorology, hydrology, geology, and water quality are discussed with respect to their individual strengths and weaknesses when applied to different scale problems. Areas where incompatabilities exist are pointed out and suggestions are made for effecting compromise. Geology can effectively operate only within large areas, all sciences have difficulty extrapolating point values to apply to areas of any size, and all sciences have difficulty working in areas on the order of 100 acres. Several suggestions as to how to best overcome these problems might be to: (1) Formulate the question to pinpoint a single objective; probably one or two disciplines will dominate the solution. (2) Develop a single propose system model based on physical processes. It is doubtful that a general model can satisfy all disciplines. (3) Select an experimental area where each discipline can work with a minimum of empiricisms. An area on the order of a few hundred acres may be the best compromise. It really satisifies no single discipline yet it provides a reasonable scale toward which all can extend their present level of expertise. (Knapp-USGS)
W71-10028

CROSS SPECTRAL ANALYSIS OF PRECIPITATION AND STREAMFLOW DATA SYSTEMS,
Nevada Univ. System, Reno, Desert Research Inst., Center for Water Resources Research.
For primary bibliographic entry see Field 07C.
W71-10037

INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (French: Interaction des eaux phreatiques et des eaux de surface dans le Delta du Danube),
State Water Committee, Bucharest (Rumania).
For primary bibliographic entry see Field 02F.
W71-10055

STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
Underwood McLellan and Associates Ltd., Winnepeg (Manitoba).
Rezaul Karim Bhuiya.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, HY 7, Paper 8242, p 949-962, July 1971. 14 p, 3 tab, 11 ref, append.

Descriptors: *Stochastic processes, *Rainfall-runoff relationships, *Statistical methods, *Fourier analysis, *Statistical models, Correlation analysis, Synthetic hydrology, Simulation analysis, Probability, Time series analysis.
Identifiers: *Stochastic models.

Harmonization of a stochastic process allows the Fourier-Stieltje's integral to represent a nonstationary stochastic process of the periodically correlated type. Therefore, periodic runoff and precipitation processes can be represented by Fourier series with random coefficients. The first order periodicity is explained by the periodicity of the first moment of the hydrologic variable. The periodicity in the covariance is explained by harmonization of the stochastic component. While generating hydrologic records for the design of water resources systems, it is often assumed that the standarized hydrologic series or the residual series, after subtraction of the periodic and trend components, are stationary. Based on Fourier series representation of periodic processes, a test for stationarity is developed. Observed monthly runoff and precipitation records are tested for stationarity as raw and transformed series. (Knapp-USGS)
W71-10172

PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN: VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
For primary bibliographic entry see Field 04A.
W71-10180

IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (Identifikatsiya nelineynykh gidrologicheskikh sistem),
Gidrometeorologicheskii Nauchno-Issledovatelskii Tsentr, Leningrad (USSR).
For primary bibliographic entry see Field 02E.
W71-10342

2B. Precipitation

THERMAL INTERACTION OF THE ATMOSPHERE AND THE HYDROSPHERE IN THE ARTIC (Russian: Teplovoye vzaimodeystviye atmosfery i gidrosfery v Arktike),
Arkticheskii i Antarkticheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
For primary bibliographic entry see Field 02C.
W71-09962

A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
Meteorological Office, Poona (India).
P. S. Sreenivasan.
Journal of Hydrology, Vol 13, No 1, p 41-53, April 1971. 13 p, 5 fig, 5 tab, 3 ref.

Descriptors: *Rainfall disposition, *Distribution patterns, *Statistical methods, *Runoff forecasting, *Droughts, Statistics, Climatology, Rain gages, Variability, Frequency analysis, Irrigation water, Forecasting, Regional analysis.
Identifiers: *India, *Bihar (India).

The monthly rainfall record for the districts of Bihar State in India was studied by the statistical method of analysis of variance. This technique brought out the significance of the main effects namely the spatial, time and spectral distribution within the year. It also indicated the significance of the first order interactions between these three groups of main effects. Using the recently developed drought analysis technique of Herbst, the drought within a district was evaluated. In general, the variability of rainfall in space for the Bihar State is more than twice the variability in time for the 30 year period under consideration. Also there is a differential behavior of rainfall in the four regions for the 5 year periods as within the periods. There is more marked differential behavior for period and within period, in districts, as tested with the corresponding interaction variance for stations within districts. Even for the seasons there is significant differential behavior of rainfall for regions only. (Knapp-USGS)
W71-10015

PARAMETER ESTIMATION FOR WET-DAY SEQUENCES,
Agricultural Research Service, Beltsville, Md. Hydrograph Lab.
David M. Hershfield.
Water Resources Bulletin, Vol 7, No 3, p 441-446, June 1971. 6 p, 3 fig, 1 tab, 6 ref.

Descriptors: *Probability, *Markov processes, *Weather forecasting, *Rainfall, Rainfall disposition, Statistical methods, Statistics, Data collections, Weather data, Weather patterns, Distribution patterns.
Identifiers: *Wet-day sequence forecasting.

All phases of weather affect agriculture, but precipitation, especially rain, probably has the greatest effect. Not only the amount of rainfall but the timing are important. It has been recognized for many years that meteorological phenomena are not isolated in time. From an agricultural point of view, the characteristic of rainfall persistency is very important. The conditional probability and the assumption of the form of a theoretical distribution are the inputs for the Markov chain. Conditional probability is defined as the probability that a wet day for a particular threshold will occur for the same event one day later. This paper describes a method for generating estimates of conditional probability information from unconditional probability statistics. Under the Markovian approach, the transition matrix is developed from historical data. This matrix provides the computational scheme for stepping from rainfall on one day to the rainfall one day later. One of the primary requirements for preparing conditional probability statistics is a large data base. To satisfy this requirement, ten years of daily data for four rainfall thresholds (states) from 42 widely separated stations in the United States were used in the analysis. The procedure developed for estimating the conditional probabilities of a wet day following a wet day provides results that are not quite as precise as those obtained previously for the dry day conditional probabilities. However, this procedure can produce reasonable results at relatively low cost. In addition, it is worth nothing that the unconditional statistics, which are readily available in published summaries, are generally unaffected by short or incomplete periods or record and can often themselves be reliably estimated. (Knapp-USGS)
W71-10023

ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
Illinois State Water Survey, Urbana.
For primary bibliographic entry see Field 03B.
W71-10026

A STATISTICAL DATA PLAN FOR BOMEX,
Booz-Allen Applied Research, Inc. Washington, D.C.
Theodore W. Horner.
National Oceanic and Atmospheric Administration Technical Memorandum ERL BOMAP 2, December 1970. 73 p, 1 fig, 1 tab, 4 ref, 2 append. BOMAP Contract No E-192-69 (n), Task 4.

Descriptors: *Weather patterns, *Atmosphere, *Synoptic analysis, *Air circulation, Earth (Planet), Investigations, Methodology, Instrumentation, Data collections, Aircraft, Ships, Meteorology, Hydrology, Atmospheric pressure, Atmospheric physics, Air-water interfaces, Winds, Oceans, Computer models, Computer programs, Equations, Data processing, Analytical techniques, Oceanography.
Identifiers: *Global weather systems.

As part of the United States contribution to the Global Atmospheric Research Project (GARP), a large-scale meteorological experiment, known as the Barbados Oceanographic and Meteorological Experiment (BOMEX), was conducted near the island of Barbados in the Caribbean from May through July of 1969. The primary goal of BOMEX was to provide data for studying the sea-air interaction that drives atmospheric circulation and global weather systems. To accomplish this goal, thousands of hours of data tape and other records were collected. Twelve ships and 29 planes were utilized. More than 1,500 personnel from government agencies, private industry, and universities participated in the project. The reduction of the BOMEX data to a form useful for storage, scientific computation and interpretation presented many statistical problems. The object of the subject contract was to provide a methodology for estimating the terms of the budget equations and for assessing the precision of the estimates. The budget equations were equations for the flux of energy from the ocean to the atmosphere into and out of the BOMEX box (an imaginary box approximately 500 kilometers square and 500 millibars of pressure differential high in an ocean area near Barbados). (Woodard-USGS)
W71-10033

HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
Georgia Inst. of Tech., Atlanta. Dept. of Civil Engineering; and Stanford Univ., Calif.
For primary bibliographic entry see Field 03B.
W71-10179

A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
Weather Bureau, El Paso, Tex; and Texas Univ., El Paso. Dept. of Civil Engineering.
Eldon V. Jetton, Hong S. Oey, and Calvin E. Woods.
Water Resources Bulletin, Vol 7, No 3, p 562-569, June 1971. 8 p, 3 fig, 1 tab, 6 ref.

Descriptors: *Rainfall, *Weather forecasting, *Precipitation (Atmospheric), *Statistical methods, Variability, Climatology, Weather data, Cloud physics, Convection, Atmospheric physics.
Identifiers: Multivariate analysis, Rainfall potential, Rainfall forecasting.

The roles played by thermodynamic stability and precipitable water in the production of rainfall are of prime importance. These two variables were combined into a 'Rainfall Potential' function by the use of multivariate statistical techniques. Data from weather stations in southern New Mexico and southwest Texas were used. The results appear promising for further investigation, possibly in relation to the occurrence of rare but extremely heavy rains. (Knapp-USGS)
W71-10319

CALCULATING PRECIPITATION IN WATER BALANCE ESTIMATES (Uchet osadkov pri vodnobalansovykh raschetakh).
A. M. Gorchakov.
In: Voprosy prognozov i raschetov stoka rek, Dal'nevostochnyy Nauchno-Issledovatel'skiy

Gidrometeorologicheskiy Institut Trudy, No 31; Leningrad, p 149-154, 1970. 6 p, 2 fig, 1 tab, 1 ref.

Descriptors: *Precipitation (Atmospheric), *Water balance, *Rain gages, Measurement, Winds, Evaporation, Forests.
Identifiers: *USSR, *Maritime Territory.

The discrepancies encountered in preparing a water balance as a result of the improper interpretation of measured precipitation are discussed in the light of corrections made to monthly precipitation totals for four groups of rain gages classified by the extent of their protection from the wind. An experiment with 20 rain gages spaced 2 m apart in 2 equal rows under a forest canopy shows that the canopy may retain an average of 11% of a 10-mm rainfall. With a total precipitation of 2-10 mm, 17% may be retained by the canopy, and as much as 25% may be retained with a total precipitation of 2 mm. The amounts of precipitation recorded by rain gages differ by over (plus or minus) 1.5 times the amounts of precipitation measured in the field. (See also W71-10180) (Josefson-USGS)
W71-10346

PRECIPITATION ADJUSTMENTS FOR RAIN-GAGE BUCKET WETTING (K voprosu o popravkakh k osadkam na smachivaniye vedra),
V. N. Glubokov.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 155-157, 1970. 3 p.

Descriptors: *Precipitation (Atmospheric), *Rain gages, *Wetting, Precipitation gages, Condensation, Seasonal, Water loss, Moisture.
Identifiers: *USSR, *Siberia, Far East.

Rain-gage bucket wetting corrections to winter precipitation totals in regions of Eastern Siberia and the Soviet Far East are examined for interpreting changes in the character and relationship of precipitation losses. Control measurements of wetting corrections to rain gage readings in January and February 1969 at the Primorskaya Water Balance Station showed that 0.03-0.05 mm of moisture was condensed in a rain gage bucket when the bucket was placed in a warm room. The water loss to wetting of bucket walls averaged 0.04 mm. The wetting correction factor for the total annual precipitation of the area is 1.04-1.08 and, occasionally, 1.10. When the monthly precipitation total during winter is less than 1 mm, the correction factor for wetting exceeds 1.30; with monthly precipitation totals of 1-5 mm and 5-25 mm, the correction factors are 1.30-1.15 and 1.15-1.10, respectively. Generally, the correction factor does not exceed 1.10 when total precipitation is more than 25-30 mm. (See also W71-10180) (Josefson-USGS)
W71-10348

RECURRING TEXAS DROUGHTS,
Texas Water Development Board, Austin.
For primary bibliographic entry see Field 07C.
W71-10410

2C. Snow, Ice, and Frost

THERMAL INTERACTION OF THE ATMOSPHERE AND THE HYDROSPHERE IN THE ARTIC (Russian: Teplovoye vzaimodeystviye atmosfery i gidrosfery v Arktike),
Arkticheskii i Antarkticheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
Yu. P. Doronin.
Leningrad, Gidrometeoizdat, 1969. 299 p.

Descriptors: *Arctic Ocean, *Atmosphere, *Ice-water interfaces, Air-water interfaces, *Heat balance, Water balance, Air circulation, Radiation, Sea ice, Sea water, Air temperature, Atmospheric physics, Heat budget, Thermodynamics, Turbulent flow, Viscosity, Evaporation, Condensation, Convection, Boundary layers.
Identifiers: *Soviet research, Hydrosphere, Heat exchange, Radiation balance, Sea surface, Thermophysics, Ice temperature, Icepacks, Baric field.

The present monograph is a continuation of earlier studies on the effect of the atmosphere on the development of hydrological and ice processes in the Arctic Ocean and its seas and on the dependence of the thermal and baric fields of the atmosphere on heat exchange with the ocean. The present-day views on the character of the thermal interaction of the atmosphere and the hydrosphere in the Arctic and on the processes developed in these media as a result of heat exchange are examined for a quantitative determination of these processes. The principal subjects discussed in the monograph include (1) turbulent heat exchange between the sea surface and the atmosphere, (2) radiation balance of the underlying surface, (3) vertical heat exchange in the sea, (4) accretion of ice and heat exchange through it, (5) effect of heat exchange with the atmosphere on spring-summer thermal processes in the surface layer of the sea, (6) development of hydrological processes in the surface sea layer, (7) effect of the Arctic Ocean on the temperature and baric field of the atmosphere, and (8) use of radiation and heat content of water for destruction of ice. An extensive bibliography on the thermodynamic interaction of the sea-ice-atmosphere system is given. (Josefson-USGS)
W71-09962

THE LAWS OF ICE PROCESSES IN DELTAS,
Danube Hydrometeorological Observatory, Izmail (USSR).
N. F. Vagin.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 296-304, 1970. 9 p, 10 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Deltas, *Rivers, *Ice breakup, *Ice jams, Melting, Streamflow, Frazil ice, Climates, Weather, Temperature, Floods.
Identifiers: *Danube Delta.

Frequent invasions of cold Arctic and warm Atlantic air masses cause conditions under which the processes of ice formation and breaking up in the Danube delta are prolonged and characterized by extreme instability. The main form of ice is frazil. High flow rates and the saturation with suspended load favor the formation of frazil. First, freezing sets in on minor delta arms, as a result of the closing up of shore ice, forming ice dams, with subsequent filling of the space between them with ice material. Ice break in the delta starts at the edge of the sea. First the mouths of arms break up, and then movement of ice covers all the mouth area. The thickest ice dams are observed in those winters when ice formation processes develop under high water level conditions. The formation of spring ice dams depends upon the severity of winter, on the character of the freeze-up, and on the intensity of the development of spring processes. According to the extent of influence of these factors, ice dams in the delta can be classified into two types: ice dams resulting from the mechanical or dynamical breaking up of ice cover, and those conditioned by the character of freeze-up during the previous autumn period. (Knapp-USGS)
W71-10042

THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
Department of Energy, Mines and Resources, Ottawa (Ontario). Inland Waters Branch.
D. K. MacKay.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 356-362, 1970. 7 p, 1 fig, 4 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Ice breakup, *Deltas, *Freezing, *Ice jams, Melting, Rivers, Climates, Forecasting, Floods, Meteorology, Discharge (Water), Streamflow forecasting, Flood forecasting.
Identifiers: *Mackenzie Delta (Canada).

Freeze-up, winter ice conditions, and break-up in the Mackenzie Delta, Canada, are broadly influenced by the transitional climate of the coastal belt. Following initial ice formation, constriction of flow in the shallow outer extremities of the delta and continued strong flow from the Mackenzie can cause appreciable lifting of channel ice covers. The delta is forested in its southern regions and open tundra in its distal portion; vegetation and wind interact on the snow cover of delta channel lakes to cause variations in ice cover thickness. Overflow is a recurrent phenomenon which is often a hazard to local travel and, to some degree, imposes a constraint on the development of a useful method of break-up prediction. Break-up is accelerated on the west side of the delta by the Peel and Rat Rivers and minor streams draining the Richardson Mountains. Ice jams, blockages, and high runoff during spring break-up can cause floods that threaten delta trappers and the settlement of Aklavik. (Knapp-USGS)
W71-10048

ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
Department of Energy, Mines and Resources, Ottawa (Ontario). Inland Waters Branch.
D. K. MacKay.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 363-375, 1970. 13 p, 7 fig, 2 tab, 13 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Permafrost, *Deltas, *Electrical studies, *Geophysics, *Surveys, Instrumentation, Mapping, Profiles, Data collections, Temperature, Resistivity, Electrical resistance, Borehole geophysics.
Identifiers: *Mackenzie Delta (Canada), Electrical resistivity surveys.

The use of resistivity as an aid in the identification of frozen rock/soil types and in mapping the upper permafrost surface is discussed with reference to the Mackenzie Delta region, Northwest Territories. Apparent resistivity ranges of some identifiable frozen materials are tabled. Of materials sounded, sands and gravels have the highest resistivities, silts the lowest, with peats falling into an intermediate category. Variations in topography, drainage, and vegetative cover may be useful indicators of relative differences in apparent resistivity. Ground temperature is an important factor affecting apparent resistivity; for example, resistivity doubles for a drop of 1.5 deg C to 2 deg C in the top three meters of frozen gravels. Resistivity techniques are of use in mapping the upper permafrost surface, particularly in deltas where numerous heat sources such as channels and lakes influence its configuration. Resistivity data complements seismic, drill-hole and ground temperature data in permafrost investigations. (Knapp-USGS)
W71-10049

PUGET PEAK AVALANCHE, ALASKA.
Ohio State Univ., Columbus. Dept. of Geology.
For primary bibliographic entry see Field 02J.
W71-10335

HEAT FLOW TO MELTING ICE ON THE USSURI RIVER (Teploprikhod k tayushchemu l'du reki Ussuri),
V. M. Timchenko.

In: Voprosy prognozov i raschetov stoka rek, Dal'nevostochnyy Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Leningrad, p 158-166, 1970. 9 p, 2 fig, 3 tab, 6 ref.

Descriptors: *Heat flow, *Heat balance, *Ice, *Thawing, *Ice-water interfaces, Forecasting, Air temperature, Solar radiation, Ice breakup, Albedo, Cloud cover, Latent heat, Specific heat, Evaporation, Condensation.
Identifiers: *USSR, *Far East, Ussuri River, Nomograms, Heat exchange, Ice cover.

The principal sources of heat flow to an ice cover on the Ussuri River during a period of thaw are solar radiation, long-wave radiation from the atmosphere and clouds, turbulent heat flow, and the latent heat of evaporation absorbed by the ice during condensation of water vapor. The heat balance of the upper surface of the ice was calculated at three points on the upper and middle course of the Ussuri River. Nomograms are constructed which reflect specific heat exchange values as a function of average daily air temperature. The specific heat flow values for different regions of the Ussuri River basin vary slightly; heat flow values in the upper (southern) part of the basin are somewhat lower than in the middle part. It is recommended that different nomograms be used for the upper and middle parts of the basin in determining the amount of heat flowing onto a unit surface of ice over a 24-hour period. The specific heat exchange values obtained from nomograms describe quite accurately the amount of heat absorbed by ice between the start of thaw and breakup, and can be used to develop forecast methods. (See also W71-10180) (Josefson-USGS)
W71-10349

TWO STAGES IN THE FORMATION OF ICE-LENSES ON FROZEN RIVERS (O dvukh stadiyakh formirovaniya naledey na promerzayushchikh rekakh),
I. A. Zil'bershteyn.
In: Voprosy prognozov i raschetov stoka rek, Dal'nevostochnyy Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Leningrad, p 167-171, 1970. 5 p, 2 fig, 5 ref.

Descriptors: *Ice, *Surface-groundwater relationships, *Surface waters, *Groundwater, *Ice-water interfaces, Rivers, Runoff, Discharge (Water), Seasonal, Freezing, Frozen soils, Precipitation (Atmospheric).
Identifiers: *USSR, *Transbaykal, Tura River, Bol'shoy Amalat River, Ice lenses, Ice cover, Frozen rivers.

The contribution of surface-and groundwaters to the formation of ice-lenses can be objectively evaluated by studying the principal features of ice-lens formation in river channels during a winter season. The formation of ice-lenses on frozen rivers of the Transbaykal occurs in two stages. The first stage, the formation of river water ice-lenses, begins with the formation of a solid ice cover in the first half of winter and ends with the freezing of the river at the sandbars. The second stage, which occurs during the second half of winter, is formation of groundwater ice-lenses and coincides with the development of a groundwater hydraulic head associated with the deep freezing of soils. These characteristics of ice-lens formation are borne out by studies conducted in 1958-59 on the Tura River (Ingoda River basin) and the Bol'shoy Amalat River (Tsipa River basin). (See also W71-10180) (Josefson-USGS)
W71-10350

2D. Evaporation and Transpiration

MEASURING EVAPOTRANSPIRATION: A REVIEW,
Hull Univ. (England). Dept. of Geography.
R. C. Ward.
Journal of Hydrology, Vol 13, No 1, p 1-21, April 1971. 21 p, 102 ref.

Descriptors: *Evapotranspiration, *Reviews, *Bibliographies, Water loss, Mathematical models, Hydraulic models, Transpiration, Evaporation, Consumptive use, Energy budget, Water balance, Hydrologic cycle.

Recent work, which has improved the possibility of calculating the evaporative water loss from a natural, vegetated surface, is reviewed. Potential evapotranspiration is defined and the validity of this concept is carefully examined. The principal approaches to the measurement of potential evapotranspiration are the transformation of measurements made from non-vegetated surfaces, the direct measurement of water losses from moist vegetated surfaces, and more or less empirical formulas. The measurement of actual evapotranspiration may be supplemented by theoretical modelling of the evapotranspiration process, physical modelling of the evapotranspiration system, and by measurement of moisture flux above the evaporating surface. (Knapp-USGS)
W71-10013

COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
Agricultural Research Service, Beltsville, Md. Hydrograph Lab.
For primary bibliographic entry see Field 02A.
W71-10021

ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
Illinois State Water Survey, Urbana.
For primary bibliographic entry see Field 03B.
W71-10026

TOTAL EVAPORATION IN THE AMUR OBLAST AND MARITIME TERRITORY DURING SUMMER MONTHS (RUSSIAN: SUMMARNOYE ISPARENIYE ZA LETNIYE MESYATSY V AMURSKO-PRIMORSKOY OBLASTI),
K. P. Bereznikov.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 46-53, 1970. 8 p, 2 fig, 3 tab, 12 ref.

Descriptors: *Evaporation, *Hydrologic cycle, *Heat balance, *Water balance, *Measurement, Soil moisture, Moisture content, Moisture deficit, Transpiration, Evaporators, Seasonal, Computers, Meteorological data.
Identifiers: *USSR, Amur Oblast, Maritime Territory, Lowlands.

Existing methods of determining total evaporation for various periods of the year are reviewed. The moisture content of an active soil layer and total evaporation from May through October are used to compute evaporation for the Amur Oblast and Maritime Territory. The areas are divided into five regions according to the length of the warm (summer) season, defined as the time between the start of thaw of the active soil layer and the end of October. A maximum evaporation of 100-120 mm was recorded in July; minimum evaporation occurred in October and varied between 25-30 mm in the north to 45-55 mm in the south and along the coast of the Sea of Japan. All calculations of evaporation were performed on the 'Minsk-1' computer. The average measure of deviation between computed and observed soil moisture did not exceed plus or minus 10% of the values measured. Due to a heat deficit, summer evaporation in mountain regions was less than that in lowland areas. The lower evaporation totals for the Prikhankayskaya Lowland and lowland areas of the Amur Oblast, as compared with neighboring, more moist regions, reflect moisture deficits at the beginning and middle of summer. (See also W71-10180) (Josefson-USGS)
W71-10187

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN: ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I YLAGI),
V. N. Glubokov.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 41-45, 1970. 5 p, 2 fig, 4 ref.

Descriptors: *Runoff, *Rainfall-runoff relationships, *Hydrologic cycle, *Water balance, *Heat balance, Regional analysis, Rivers, Radiation, Evaporation, Precipitation (Atmospheric), Watersheds (Basins).
Identifiers: *USSR, *Siberia, *Far East, Lake Baykal.

A new method is proposed for calculating runoff in areas of the USSR east of Lake Baykal. A relationship is established between runoff and the radiation index of dryness R/Lx, where R is the annual radiation balance of an underlying surface, L --the latent heat of evaporation and x --the total annual precipitation. The area examined is divided into six regions based on the character of the relationship of the index of dryness to terrain height and total precipitation. Regional graphs of the relationship make it possible to examine the runoff of 70 small and medium-size rivers with basin areas ranging in size from 5.35 to 72,100 sq km. The average deviation between computed and observed runoff values is plus or minus 14%. Deviations in over 40% of the cases do not exceed plus or minus 10% or plus or minus 15% in 65% of the cases. (See also W71-10180) (Josefson-USGS)
W71-10188

2E. Streamflow and Runoff

PROCEEDINGS OF TWENTY-FOURTH ANNUAL NEVADA WATER CONFERENCE.
For primary bibliographic entry see Field 06B.
W71-09951

NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,
Illinois State Water Survey, Urbana.
For primary bibliographic entry see Field 07C.
W71-10010

INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
Agricultural Research Service, Tucson, Ariz. Southwest Watershed Research Center.
For primary bibliographic entry see Field 02A.
W71-10014

OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
Missouri Univ., Rolla. Dept. of Civil Engineering.
D. L. Fread, and T. E. Harbaugh.
Journal of Hydrology, Vol 13, No 1, p 70-80, April 1971. 11 p, 4 fig, 1 tab, 5 ref.

Descriptors: *Open channel flow, *Unsteady flow, *Mathematical studies, *Computer programs, *Flow profiles, Backwater, Flow measurement, Supercritical flow.
Identifiers: *Newton's iteration technique.

Computation of surface profiles for steady gradually varied flow can be accomplished by use of Newton's Iteration Technique. The magnitude of error is controlled and the profile depth can be conveniently calculated at selected distances upstream or downstream from a control point. A FORTRAN IV program is provided for utilizing the technique in a trapezoidal channel. (Knapp-USGS)
W71-10018

ESTIMATION OF SRUFACE WTER LAG TIME FROM THE KINEMATIC WAVE EQUATIONS,
Agricultural Research Service, Beltsville, Md. Hydrograph Lab.
D. E. Overton.
Water Resources Bulletin, Vol 7, No 3, p 428-440, June 1971. 13 p, 9 fig, 10 ref.

Descriptors: *Overland flow, *Routing, *Time lag, *Rainfall-runoff relationships, *Mathematical models, Waves (Water), Hydrographs, Hydrograph analysis, Runoff forecasting, Unsteady flow, Time of concentration.
Identifiers: *Kinematic waves.

Hydraulic solutions are presented for several ideal surfaces using kinematic wave equations. These surfaces are: (1) a uniform plane; (2) hillslope as a cascade of planes; (3) V-shaped watershed; (4) V-shaped watershed with hillslopes; (5) converging surface; (6) concave surface. The lag times are related to roughness, length and catchment slope, and input rate. These relations may be used in predicting lag time as the parameter in a unit response function. A lag relation was developed for a nonuniform catchment in terms of the lag of a uniform plane and a convergence factor. A numerical procedure is given whereby the convergence factor can be evaluated for any nonuniform catchment from observed input and output data. (Knapp-USGS)
W71-10022

ANNUAL, SEASONAL, AND MONTHLY CHANGES IN RUNOFF IN THE UNITED STATES,
Indiana Univ., Bloomington. Dept. of Geography.
John J. Hidore.
Water Resources Bulletin, Vol 7, No 3, p 554-561, Jun 1971. 8 p, 2 fig, 4 tab, 4 ref.

Descriptors: *Runoff, *Time series analysis, *United States, *Regional analysis, Streamflow forecasting, Runoff forecasting, Variability, Annual, Seasonal, Correlation analysis.
Identifiers: Runoff trends.

The runoff from a series of watersheds in the United States is examined to determine if there are distinct trends present. The data are examined for the period 1931-1960 and the results compared with those obtained for the period from the beginning of record to 1960. A larger sample of streams with records of various lengths is also utilized. The data used are annual, seasonal, and monthly values. The streams are grouped geographically to determine if regional patterns exist. The runoff increased on the majority of streams for the period 1931-1960, but for the period from the beginning of record to 1960 most streams exhibited a negative trend. When geographical distribution is considered, the streams located in the interior of the continent show greater similarity of trend than those on the continent margina. (Knapp-USGS)
W71-10029

HYDRAULIC CALCULATION OF WATER DISCHARGE AND LEVELS IN RIVER DELTAS,
Arkticheskii i Antarkticheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
V. V. Ivanov.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 239-246, 1970. 8 p, 9 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Stage-discharge relations, *Deltas, *Numerical analysis, Computer programs, Open channel flow, Alluvial channels, Water level fluctuations, Tides.
Identifiers: *USSR, Ob River, Kolyma River.

A method of hydraulic calculation of channel discharge and water levels in river deltas is a development of iteration techniques. It amounts to the determination of discharge in anabranches and water levels in the junction nodes. The method does not require the exact assumption of the flow direction in the anabranches. It allows an analytical calculation of the corrections to the stage in the junction nodes and it converges the solution for delta forks of any complexity. The calculation is readily automated. A program for calculation of complex braiding of river channels was worked out for an electronic computer of the Ural 2 type in the Arctic and Antarctic Research Institute, Leningrad. The program provides for any number of anabranches of the delta with the water flow directed in and out of the channel braiding, with given stage. The relationship between channel discharge and water level in the zone of tidal and surge-back water was investigated by hydraulic theory and electronic computer. A numerical check of the method was carried out on the deltas of the Ob River and the Kolyma. (Knapp-USGS)
W71-10038

DESIGN LEVELS IN THE TRANSITION ZONE BETWEEN THE TIDAL REACH AND THE RIVER REGIME REACH,
Rijkswaterstraat, Voorburg (Netherlands).
For primary bibliographic entry see Field 08B.
W71-10039

ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
Jadavpur Univ., Calcutta. (India). Dept. of Electrical Engineering; and Calcutta Port Commissioners (India). Hydraulic Study Dept.
S. Das Gupta, and K. K. Bandyopadhyay.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 273-287, 1970. 15 p, 5 fig, 12 ref, append. (Also published in IASH Publication No 91, 1970).

Descriptors: *Water level fluctuations, *Deltas, *Tides, *Tidal effects, *Stage-discharge relations, Linear programming, Numerical analysis, Computer programs, Mathematical models, Backwater, Waves (Water).
Identifiers: *India, Hooghly River (India).

The determination of reflection and energy content in a branched tidal river due to the inception of a tidal wave is important in order to study the general variation of tidal level and discharge through various sections of the river and its branches. With a linearized version of the governing differential equations, the scatter matrix representation of the tidal channel handles the situation with ease; in fact, scattering takes care of the multiple reflections which occur in such a complicated system and gives a general expression of the reflected components at each outlet corresponding to a given set of incident waves. A scatter matrix was derived for an exponential tidal channel and for the general problem of any tidal channel with branches. Examples have been given from River Hooghly (India) in conjunction with its tributary River Rupnarain. (Knapp-USGS)
W71-10040

DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL (French: Donnees sur les characteristiques des courants fluviaux de surface a l'embouchure du canal de Sulina),
Institute of Hydrotechnical Research, Bucharest (Rumania).
C. Bondar, V. Roventa, and I. State.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 287-295, 1970. 9 p, 4 fig, 8 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Mixing, *Saline water intrusion, *Deltas, *Jets, *Stratified flow, Saline water-freshwater interfaces, Streamflow, Discharge (Water), Density stratification.
Identifiers: *Danube River.

Surface floats (1 m draught) launched from the Sulina mouth of the Danube were used to study the trajectories of the river currents and the limits of the river water spreading into the sea. The surface currents disperse in two distinct forms, functions of the hydrological Danube River regime and of the sea water penetration: jets, when sea waters do not penetrate into the channel mouth; fans, when the sea waters penetrate along the river bed. Jets diverge into the sea at angles of 7 to 9 deg, up to the zone where the river jet masses lose touch with the bottom. Fans diverge in angles larger than 30 deg, the limits and the plane development of the fan being invariable with respect to discharge. (Knapp-USGS)
W71-10041

THE LAWS OF ICE PROCESSES IN DELTAS,
Danube Hydrometeorological Observatory, Izmail (USSR).
For primary bibliographic entry see Field 02C.
W71-10042

HYDRAULIC CHARACTERISTICS OF THE HYDROMETRIC SECTION AT THE MOUTH OF THE SULINA ARM (French: Caracteristiques hydrauliques de la section hydrometrique a l'embouchure du bras de Sulina),
Institute of Hydrotechnical Research, Bucharest (Rumania).
For primary bibliographic entry see Field 02J.
W71-10043

THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
State Oceanographic Inst., Moscow (USSR).
For primary bibliographic entry see Field 02K.
W71-10046

THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
Department of Energy, Mines and Resources, Ottawa (Ontario). Inland Waters Branch.
For primary bibliographic entry see Field 02C.
W71-10048

A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
Institute of Hydrotechnical Research, Bucharest (Rumania).
For primary bibliographic entry see Field 08B.
W71-10056

CERTAIN ASPECTS OF THE INFLUENCE ON THE HYDROLOGIC REGIME OF HYDRAULIC WORKS FOR THE IMPROVEMENT OF NAVIGATION IN THE DANUBE DELTA (French: Certains apsects de l'influence sur le regime hydrologique des travaux hydrauliques effectues pour l'amelioration de la navigation dans le delta du Danube),
For primary bibliographic entry see Field 08B.
W71-10058

RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
Arkticheskii i Antarkticheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
For primary bibliographic entry see Field 08B.
W71-10061

WIND-INDUCED CIRCULATION IN SHALLOW WATER,
Missouri Univ., Columbia. Dept. of Civil Engineering; and Universidad Nacinal de Columbia, Bogota. Dept. of Civil Engineering.
Henry Liu, and Himerio J. Perez.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY7, Paper 8235, p 923-935, July

1971. 13 p, 8 fig, 15 ref, append. Missouri Water Pollution Board Grant WP5-6.

Descriptors: *Water circulation, *Mathematical models, *Hydraulic models, *Lakes, *Winds, Currents (Water), Wind pressure, Hydraulics.
Identifiers: Wind-induced water circulation.

Equations are derived for the computation of the three-dimensional circulation of water caused by steady wind. The equations are applicable to any wind-stress distribution and to basins of any geometry, as long as the horizontal dimension of the basin is not larger than a few thousand feet. Results of the computation indicate that circulations in areas remote from banks are unaffected by bank slope, drift velocity decreases almost linearly with wind speed, the position of zero velocity of vertical velocity-profile remains practically unchanged with wind speed and it shifts upwards in shoaling water as the bank is approached, and drift velocity decreases with flow depth in shoaling water. These results are in qualitative agreement with experimental findings reported in the literature. (Knapp-USGS)
W71-10170

FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
Southampton Univ. (England). Dept. of Civil Engineering.
For primary bibliographic entry see Field 08B.
W71-10173

FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
Georgia Inst. of Tech., Atlanta. Dept. of Civil Engineering.
For primary bibliographic entry see Field 08B.
W71-10174

DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
Canterbury Univ., Christchurch (New Zealand). Dept. of Civil Engineering; and Lincoln Coll., Canterbury (New Zealand). Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 08B.
W71-10177

PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN: VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
For primary bibliographic entry see Field 04A.
W71-10180

A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAYKAL BASED ON PRECIPITATION (RUSSIAN: PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
For primary bibliographic entry see Field 04A.
W71-10181

FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN: PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
For primary bibliographic entry see Field 04A.
W71-10182

A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN: PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
For primary bibliographic entry see Field 04A.
W71-10183

CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN: RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORREKTSII),
For primary bibliographic entry see Field 04A.
W71-10184

A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN: RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
I. N. Gartsman.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 63-68, 1970. 6 p, 3 fig, 1 tab, 4 ref.

Descriptors: *Water balance, *Hydrologic cycle, *Channels, *River systems, *Water storage, Runoff, Channel erosion, Discharge (Water), Slopes, Time lag, River basins, Watersheds (Basins), Hydrography, Overland flow, Channel flow.
Identifiers: *USSR, *Far East, Tok River, Arga River, Channel capacity.

A river network should be viewed as a product of a long-term complex natural-historical process, which reflects the hydrologic cycle of a basin and the resistance of a basin surface to erosion. A logical basis for seeking relationships between a channel network and flood runoff lies in the assumption that a specific minimum discharge is necessary to form a temporary or permanent water course. The regulating capacity of channel structures increases with increase in the specific density of a river network and with a decrease in the water yield. Variability in regulative capacities is caused by differences in the natural conditions of mountain and flatland basins and by their varied exposure to the predominant direction of moisture and heat transfer. As illustrated by the Tok and Arga River basins, the regulating capacities of river systems, evaluated by channel flow, reflect the peculiarities of their physico-geographic structure. Overland flow and channel flow can be used as a general index for river basins in such a way that basins may be classified by lag time, despite differences in basin size and extent of basin afforestation and waterlogging. An important indicator of the regulating capacity of a basin is the recession rate, related to effective basin water storage. (See also W71-10180) (Josefson-USGS)
W71-10185

STORM FLOOD FORMATION PROCESSES (RUSSIAN: PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
I. N. Gartsman, and V. M. Lylo.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 3-40, 1970. 38 p, 6 fig, 4 tab, 22 ref.

Descriptors: *Flood routing, *Hydrologic cycle, *Water balance, *Rainfall-runoff relationships, *Runoff forecasting, Channel flow, Base flow, Unsteady flow, Overland flow, Surface runoff, Subsurface runoff, Water loss, Flow rates, Water yield, Precipitation (Atmospheric), Water storage, Wetting, Soils, Storm runoff, Withdrawal, Routing.
Identifiers: *USSR, *Far East, Moisture capacity, Travel time.

New data have been obtained on the formation of flood runoff in the Soviet Far East. The basic stages in the formation of storm floods include the formation of runoff and its recession, overland flow, and channel flow. Two types of runoff formation are described--subsurface runoff or interflow and surface runoff. Subsurface runoff is caused by an excess of water storage in soils above the level corresponding to the soils' minimum moisture capacity. In the Soviet Far East this type of runoff is predominant. Surface runoff is the result of a greater rate of water inflow to the basin surface than can be absorbed. In the area under study this type of runoff is usually unsteady flow. Flood routing is based upon the decelerating or lag effect of the channel on flow, which leads to an uneven distribution of flow velocities in the channel. Two interdependent routings have been identified: 'stratification' and mass exchange. (See also W71-10180) (Josefson-USGS)
W71-10189

STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
National Aeronautic and Space Administration, Hampton, Va. Langley Research Center; and Purdue Univ., Lafayette, Ind. School of Aeronautic, Astronautic and Engineering Sciences.
For primary bibliographic entry see Field 08B.
W71-10317

GENERATED MONTHLY STREAMFLOWS FOR THE MIDWESTERN AND SOUTHWESTERN UNITED STATES,
Houston Univ., Tex. Dept. of Civil Engineering; and Northwestern Univ., Evanston, Ill. Dept. of Civil Engineering.
Jerry R. Rogers, and Robert S. Gemmel.
Water Resources Bulletin, Vol 7, No 3, p 581-591, June 1971. 11 p, 1 fig, 11 tab, 10 ref.

Descriptors: *Simulation analysis, *Time series analysis, *Streamflow, *Synthetic hydrology, Mathematical models, Variability, Statistics, Statistical methods, Statistical models, Distribution patterns, Regression analysis, Streamflow forecasting, Runoff forecasting.
Identifiers: Runoff variability.

Critical examinations of a gage site, the monthly streamflow statistical characteristics for two southern Illinois rivers, an Oklahoma river, and a Texas river were made using a digital computer. High flow variability for the rivers was evident in that, for the river tested, 8 to 11 months had coefficients of variation in excess of unity. The gamma distribution was not as efficient as the normal distribution for fitting power of logarithmic transforms of the historical monthly flow data. No single transform to a normal distribution was adequate for all twelve monthly flows, since definite seasonal grouping patterns were found for the four rivers examined. The highly variable flow in the low-flow seasons indicated much more skewness than was typical of the remainder of the year. For the low-flow seasons, the higher-root (smaller exponent) transforms were particularly useful. Flows were simulated from a linear regression model of lag one utilizing two or more transforms for the twelve periods. The definite seasonal patterns found historically were reproduced quite well in the generated streamflows. The effect of a change in data transform from one season to the next was insignificant after one month. Thus the use of different transforms within the year did not bias the results from the linear regression model appreciably, but did help in reproducing the seasonal distribution pattern. The technique seems especially well suited for rivers with highly variable flows. (Knapp-USGS)
W71-10321

SIMULATION MODEL OF STREAM CAPTURE,
Virginia, Univ., Charlottesville. Dept. of Environmental Sciences.
Alan D. Howard.
Geological Society of America Bulletin, Vol 82, No 5, p 1355-1375, May 1971. 21 p, 6 fig, 1 tab, 19 ref.

Descriptors: *Simulation analysis, *Drainage patterns (Geologic), *Tributaries, *Geomorphology, *Drainage density, Geologic control, River systems, Model studies, Mathematical models, Statistical methods, Stochastic processes.
Identifiers: *Stream capture.

Because the process of capture in the formation of stream networks is difficult to evaluate by field or map studies, a simulation model involving capture within rectangular stream networks on a square matrix was used. The simulation rules make the probability of capture of a stream by a lower adjacent stream proportional to the advantage in gradient of the potential path of capture between the stream compared to the present gradient of the higher stream. Both the networks simulated by capture and the natural networks have similar slight deviations from topological randomness. The capture simulations more closely predict many properties of natural networks than do completely random methods of simulation, such as the random walk. Capture should have its greatest relative importance in early stages of drainage basin evolution. (Knapp-USGS)
W71-10337

IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (Identifikatsiya nelineynykh gidrologicheskikh sistem),
Gidrometeorologicheskii Nauchno-Issledovatelskii Tsentr, Leningrad (USSR).
L. S. Kuchment, and Ye. N. Borshchevskiy.
Meteorologiya i Gidrologiya, No 1, p 42-47, January 1971. 6 p, 2 fig, 6 ref.

Descriptors: *Model studies, *Hydrographs, *Systems analysis, *Linear programming, Flood routing, Time series analysis, Optimization, Mathematical models, Streamflow forecasting, Rainfall-runoff relationships, Runoff, Water levels, Effective precipitation, Time lag, Discharge (Water).
Identifiers: *USSR, Volga River, Laguerre functions.

Many hydrological systems may be viewed as one-dimensional dynamic systems with combined parameters, which transform the input function of time into a runoff hydrograph or into some other chronological graph of hydrological values. Methods are given for identifying nonlinear hydrological systems with combined parameters, based on representation of a nonlinear system in the form of a functional series and on application of Laguerre functions. The feasibility of applying these methods is illustrated by the calculation of a flood wave transformation for the Volga Hydroelectric Power Station in the reach from the dam to the village Verkhne-Lebyazh'ye. The procedures examined may also be used to define graphs of water level changes from runoff hydrographs at an upstream cross section (in the presence of a linear curve of discharges) and to define runoff hydrographs from the effective rainfall. (Josefson-USGS)
W71-10342

A STORM FLOOD HYDROGRAPH FORECAST FOR RIVERS ON THE MARITIME TERRITORY FROM RUNOFF OF REPRESENTATIVE BASINS (Metodika prognoza gidrografa dozhdevykh pavodkov rek Primor'ya na osnove ucheta stoka pokazatel'nykh basseynov),
For primary bibliographic entry see Field 04A.
W71-10344

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (Prognoz ob'yema i maksimal'nogo stoka malykh rek),
For primary bibliographic entry see Field 04A.
W71-10345

A SHORT-TERM FORECAST OF INFLOW TO THE RESERVOIR OF THE ZEYSKAYA HYDROELECTRIC POWER PLANT (Kratkosrochnyy prognoz pritochnosti v vodokhranilishche Zeyskoy GES),
For primary bibliographic entry see Field 04A.
W71-10347

VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (Izmenchivost' vnutrigodovogo raspredeleniya stoka rek Vostochnogo Zakavkaz'ya),
Moscow State Univ. (USSR). Dept. of Arid Land Hydrology.
V. D. Bykov, and A. N. Vazhnov.
Vestnik Moskovskogo Universiteta: Geografiya, No 2, p 43-52, March-April 1968. 10 p, 4 fig, 2 tab, 5 ref.

Descriptors: *Runoff, *Variability, *Hydrogeology, *Mathematical studies, Base flow, Seasonal, Groundwater recharge, Correlation analysis, Elevation, Watersheds (Basins), Regression analysis, Low flow, Floods, Rainfall-runoff relationships.
Identifiers: *USSR, Transcaucasia, Greater Caucasus, Lesser Caucasus, Highlands.

The parameter describing the annual distribution of runoff in the Eastern Transcaucasus (ratio of April-June runoff to July-September runoff) varies inversely with the basin elevation. This is true of separate geographic regions and is expressed by a hyperbolic flow equation. The invluence of the geological structure of the basin area is manifest only in volcanic-highland regions. For the area under study the parameter varies from 1.0-1.5 to 3.5-7.0 for elevations of 2,000 to 2,800 m and generally increases in a southeasterly direction. A second parameter, showing the ratio between runoff values during the warm and cold seasons, depends only slightly on basin elevation. (Josefson-USGS)
W71-10354

2F. Groundwater

SEEPAGE FORCE ON INTERFACIAL BED PARTICLES,
Georgia Inst. of Tech., Atlanta. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02J.
W71-09943

HYDROGEOLOGY OF THE USSR: VOLUME 34, THE KARAGANDA OBLAST (Russian: Gidrogeologiya SSSR: Tom XXXIV, Karagandinskaya oblast),
All-Union Scientific Research Inst. of Hydrogeology and Engineering Geology, Moscow (USSR).

I. Ye. Falevich, Editor. Moscow, 'Nedra' Publishing House, 1970. 563 p.

Descriptors: *Hydrogeology, *Engineering geology, *Structural geology, *Aquifers, *Groundwater, Water supply, Geologic formations, Groundwater recharge, Geomorphology, Mineral water, Climatic data, Orography, Hydrography, Soils, Vegetation, Stratigraphy, Rocks, Rivers, Watersheds (Basins), Water chemistry.
Identifiers: *USSR, *Kazakhstan, *Karaganda Oblast, Tectonics, Regionalization.

Volume 34 of the series 'Hydrogeology of the USSR' is the first major summary work on the hydrogeology of the Karaganda Oblast--the principal industrial area of the Kazakh Republic. The first section of the three-part monograph reviews the history of hydrogeological and engineering-geological studies in the area and discusses the natural factors which influence the formation of groundwaters. The second and longest section entitled 'Groundwaters' is devoted to a study of the general hydrogeological conditions of the oblast and to a systematic description of the principal aquifers and aquifer complexes of the various hydrogeological regions. Particular attention is paid to groundwater origin, resources, storage and conservation. A brief description is given of medicinal mineral waters, mineral muds and the mineral deposits of the area. The concluding section examines the engineering-geological complexes of the three tectonic regions of the oblast: the Kazakh fold formations (central part), the Chu syneclise (northern part) and the Turgay depression (southeastern part). (Josefson-USGS)
W71-09963

OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
Unit of Soil Physics. Agricultural Research Council, Cambridge (England).
For primary bibliographic entry see Field 04B.
W71-10017

VARIATION OF SPECIFIC RETENTION IN RUBBLY ROCK PARTICLES,
Khartoum Univ., (Sudan). Dept. of Geology.
Ismail M. El Boushi.
Journal of Hydrology, Vol 13, No 1, p 81-90, April 1971. 10 p, 4 fig, 3 tab, 10 ref.

Descriptors: *Specific retention, *Gravels, *Porous media, Aquifers, Capillary water, Porosity, Particle size, Particle shape, Mineralogy, Permeability, Specific yield, Water storage, Laboratory tests, Hydraulic models.

The specific retention of crystalline rubbly rock material increases with a decrease in particle size, and an increase of surface area. The shape of the particles and the type of the rock has little or no effect on specific retention. (Knapp-USGS)
W71-10019

PARAMETER ESTIMATION FOR AQUIFER EVALUATION,
Maryland Univ., College Park. Dept. of Civil Engineering.
Yaron M. Sternberg.
Water Resources Bulletin, Vol 7, No 3, p 447-456, June 1971. 10 p, 2 tab, 47 ref.

Descriptors: *Aquifer characteristics, *Mathematical models, *Analog models, *Transmissivity, *Storage coefficient, Estimating, Permeability, Water levels, Water yield, Drawdown, Groundwater movement, Hydrogeology.
Identifiers: *Aquifer evaluation, Pumping tests.

The various tools and techniques available for evaluation of aquifers are reviewed. Data for evaluation studies can be obtained from laboratory experiments, geological maps, well logs and field studies. Such data can be used in analytic or electric analog models to determine the sustained yield of the aquifer under various operating conditions. Geologic maps provide data on the type of formation and its make up. Well logs give detailed information on the lithology at a particular location. Data from a number of well logs of the aquifer can delineate the dimensions of the aquifer. The aquifer characteristics can be determined from field pumping tests or obtained indirectly from laboratory experiments. Pumping tests can also indicate the presence of a geologic boundary such as an impermeable boundary. For aquifers with relatively simple geometric boundaries and aquifer characteristics, a mathematical model is generally adequate for estimating the water yield. For more complex aquifers where for example salt water intrusion may pose a problem, more detailed information can be obtained by using an electric analog model. Thus the accuracy of the desired information must determine the type of model to use and the quantity of the basic data required. (Knapp-USGS)
W71-10024

PARAMETER ESTIMATION IN HYDROLOGY: THE STATE OF THE ART,
Pennsylvania State Univ., University Park. Dept. of Civil Engineering.
Donald R. Jackson, and Gert Aron.
Water Resources Bulletin, Vol 7, No 3, p 457-472, June 1971. 16 p, 1 fig, 47 ref.

Descriptors: *Aquifer characteristics, *Mathematical models, *Analog models, *Transmissivity, *Storage coefficient, Estimating, Permeability, Water levels, Water yield, Drawdown, Groundwater movement, Hydrogeology.
Identifiers: *Aquifer evaluation, Pumping tests.

A detailed review of current methods and criteria used in parameter estimation in hydrology is presented. The effect of errors in the data set and the effect of intera interactions between methods of analysis, criteria, data set errors, and modeling assumptions are reviewed and discussed briefly. It is concluded that study techniques criteria, data set errors, and particularly interactions between these, is essential to further progress in hydrologic modeling. (Knapp-USGS)
W71-10025

HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
Princeton Univ., N.J. Dept. of Civil and Geological Engineering.
For primary bibliographic entry see Field 02L.
W71-10050

REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
Egyptian Desert Inst., Cario.
A. Shata, and I. El Fayoumy.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 385-396, 1970. 12 p, 16 fig, 14 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Deltas, *Hydrogeology, *Stratigraphy, *Aquifers, Water supply, Water yield, Groundwater movement, Water levels, Irrigation water, Saline water intrusion.
Identifiers: *Nile Delta.

The Nile Delta (22,000 sq km) acts as an important reservoir for groundwater. In this reservoir, the strata of hydrologic importance are composed of Pleistocene and Holocene sands and gravels which have a thickness exceeding 300 m: The water contained in such strata (salinity of the order of 500 ppm) exists generally under unconfined conditions and depends for its source upon the surface water of the Nile and upon the intermittent surface runoff of the adjacent desert areas. In this paper, the physiography, stratigraphy, structure, chemistry and hydrology of the Nile Delta are discussed. (Knapp-USGS)
W71-10051

GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN: THE GREAT BASIN, U.S.A.,
Geological Survey, Salt Lake City, Utah., and Geological Survey, Menlo Park, Calif.
Ted Arnow, J. H. Feth, and R. W. Mower.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 396-407, 1970. 12 p, 4 fig, 1 tab, 4 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Groundwater basins, *Hydrogeology, *Deltas, *Aquifers, Alluvium, Utah, Idaho, Nevada, Water quality, Water yield, Water storage, Groundwater movement, Discharge (Water), Water supply.
Identifiers: *Lake Bonneville, *Bonneville Basin.

Deltaic deposits that formed in the Bonneville Basin in the Great Basin of the United States during Pleistocene, and possibly late Tertiary, time now are important groundwater reservoirs. Among the largest of the deltas in the Great Basin are those of the Weber and Sevier Rivers, which cover areas of about 520 and 910 square kilometers, respectively. Each delta contains two principal artesian aquifers, which are recharged by seepage from streams and from other sources. The Weber and Sevier Deltas are small compared to many ancient and modern deltas, but their size has allowed them to be studied rather intensively. The Weber Delta in places contains fresh water to a depth of 400 meters. Water in the delta is of three chemical types; two are probably original types, whereas the other may have been derived by ion exchange. The Sevier Delta in places contains fresh water to a depth of about 370 meters. Recharge that has occurred since irrigation began upstream from the delta has resulted in the introduction of slightly saline water that is slowly moving downdip in the aquifers of the delta. (Knapp-USGS)
W71-10052

THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
Egyptian Desert Inst., Cario.
Nabil Rofail, and Sofia Tadros.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 408-415, 1970. 8 p, 5 fig, 5 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Analog models, *Hydrogeology, *Deltas, *Aquifers, *Surface-groundwater relationships, Water levels, Alluvium, Groundwater movement, Water yield, Transmissivity, Saline water intrusion.
Identifiers: *Nile Delta.

The water bearing formations of the Nile Delta can be considered as a two layered aquifer. The hydraulic parameters of the aquifer determined from the analysis of the pumping test data conformed with those obtained by analysis of the water fluctuation in the wells. Accordingly a hydraulic diffusivity map of the Nile Delta was plotted. The flow through the aquifer of the Nile Delta was simulated by the flow of an electric current through paper of different values of resistivity used as a conductive material. The head of water in the River Nile Branches and in the main canals was represented by electric potentials. By this technique the groundwater hydrology of the Nile Delta basin may be estimated, and a water table map was plotted. (Knapp-USGS)
W71-10053

CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (French: Considerations sur l'interaction entre les eaux de surface et souterraines du territoire du Delta du Danube),
Institutul de Medicina se Farmacia, Iasi (Rumania). Catedra de Igiena.
For primary bibliographic entry see Field 05B.
W71-10054

INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (French: Interaction des eaux phreatiques et des eaux de surface dans le Delta du Danube),
State Water Committee, Bucharest (Rumania).
M. Podani, I. Zavaianu, and D. Baluta.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 431-436, 1970. 6 p, 3 fig. (Also published in IASH Publication No 91, 1970).

Descriptors: *Hydrogeology, *Deltas, *Surface-groundwater relationships, *Groundwater movement, *Aquifers, Water level fluctuations, Alluvium, Water yield, Water quality, Water chemistry, Hydrographs.
Identifiers: *Danube Delta.

The regime of the phreatic nappes located in the 65 m thick alluvial sediments of the Danube Delta is determined by the yield of surface waters provided by the arms, channels and pools of the Danube Delta. In such sediments, two complexes of horizon are distinguished; the lower complex is composed of coarse deposits generating since the predeltaic stage, and the upper complex includes psammitic and aleuritic formations from the deltaic stage. The aquifers from both complexes display hydrochemical differences but are still linked to one another and subject to the Danube hydrological regime. Water level rise and drawdown in observation wells are due to the hydrostatic effect of the Danube water masses. A description is given of the further development of an observation network concerning the Danube Delta groundwater yields. (Knapp-USGS)
W71-10055

GROUND WATER RESOURCES AND DEVELOPMENT: COASTAL PLAIN REGION ERH JEN CHI--KAOHSIUNG, TAIWAN,
Hawaii Univ., Honolulu. Water Resources Research Center.
L. Lau Stephen, John F. Mink, and Chester Lao.
Technical Report No 47, May 1971, 153 p, 16 fig, 9 tab, 34 ref, 8 append.

Descriptors: *Taiwan, *Groundwater, Tainan, Kaohsiung, Sugar cane, Aquifer, *Aquifer characteristics, *Geological surveys, Wells, Hydrogeology.

A pilot ground-water study was conducted of a 200 square kilometer area of the intensively cultivated coastal plain of southwestern Taiwan to identify the methods and knowledge that are essential for the evaluation of ground water resources and development. Geologic, hydrologic, geochemical, and developmental aspects were examined with existing data and augmented data developed by the project. The aquifer is the top 10 meters of very fine to fine sands of the Tainan formation having permeability of about 10 meters per day. The underlying Gutingkeng formation is of massive clay of marine origin. Residual saline water posts a constraint to the water quality of the Tainan formation. No contemporaneous coastal seawater intrusion was observed. Present exploitation consists of numerous shallow wells tapping the Tainan formation. Studies show that the natural ground-water recharge coupled with existing importation can satisfy the supplementary irrigation water requirements even if the entire arable land in the area is cultivated. Low aquifer transmissibility coupled with high well loss will require the use of wells of low capacity carefully designed, constructed and maintained in order to develop additional ground water.
W71-10163

VERTICAL RECHARGE OF UNCONFINED AQUIFER,
Washington Univ., Seattle. Charles W. Harris Hydraulics Lab.
For primary bibliographic entry see Field 02G.
W71-10176

VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
California Univ., Berkeley. Dept. of Civil Engineering.
Shlomo P. Neuman, and Paul A. Witherspoon.
ASCE Proceedings, Journal of the Engineering Mechanics Division, Vol 97, No EM2, Paper 8023, p 359-374, April 1971. 75 p, 1 fig, 29 ref, 4 append.

Descriptors: *Porous media, *Groundwater movement, *Confined water, *Water table, *Soil water movement, Steady flow, Unsteady flow, Boundary processes, Flow mathematical studies.
Identifiers: *Variational methods.

Variational methods are being employed to an increasing degree in solving various types of trans-

port problems. It appears that these methods will have increasing use in attacking many boundary-value problems concerned with fluid flow through porous media. The basic approach is to replace the boundary-value problem by an appropriate variational principle whose minimizing function is the solution to the problem. Variational principles are given for several problems of confined and unconfined flow. (Knapp-USGS)
W71-10318

TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
Koninkliyke/Shell-Laboratorium, Amsterdam (Netherlands).
For primary bibliographic entry see Field 05B.
W71-10325

ESTIMATING STORAGE CAPACITY IN DEEP ALLUVIUM BY GRAVITY-SEISMIC METHODS,
Agricultural Research Service, Tucson, Ariz.
D. E. Wallace, and D. P. Spangler.
Bulletin of the International Association for Scientific Hydrology, Vol 15, No 2, p 91-104, June, 1970. 14 p, 9 fig, 2 tab, 13 ref.

Descriptors: Groundwater, *Groundwater basins, Groundwater geology, Groundwater potential, *Storage capacity, Alluvium, Seismic refraction, *Gravimetry, *Seismic investigations, Seismic prospecting, *Underground water storage, Seismic velocity, Hydrogeology, Gravity studies, Field investigations, Subsurface investigations, Underground storage.
Identifiers: Alluvial aquifers, Gravity measurement.

Large volumes of ground water are contained in the deep intermontane valleys of basin and range regions. Determining the shape and storage capacity of basins by drilling can be expensive and difficult because of the depth of the alluvium and the large areas involved. Difficulties often can be overcome by combining gravimetric and seismic refraction interpretations. Basin boundaries are determined by gravimetric methods, with bulk density samples taken of all representative formations. Density values can be correlated with seismic velocities to estimate subsurface porosities. Studies indicate that seismic velocity varies inversely with porosity for the alluvial deposits. These values can be correlated with respective formations in the basin from geologic sections derived from the seismic refraction survey. Present and potential storage capacity can be computed when the volume and porosity of the alluvium are known. (USBR)
W71-10384

OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
High Plains Underground Water Conservation District No. 1, Lubbock, Tex.
For primary bibliographic entry see Field 04B.
W71-10413

AQUIFER MODEL RESEARCH REVIEWED.
High Plains Underground Water Conservation District No. 1, Lubbock, Tex.

The Cross Section, Vol 16, No 3, Mar 1970, p 1. 1 fig.

Descriptors: *Digital computers, *Model studies, *Water levels, *Groundwater mining, *Water management (Applied), Inflow, Aquifers, Calibrations, Hydrologic data, History, Withdrawals, Controls, Computer programs.
Identifiers: *Ogallala Formation, Texas Southern High Plains, Outflow, Well development.

Progress on development of a research digital model of the Ogallala Formation, Texas Southern High Plains, is presented. The model is insensitive to subsurface inflow and outflow. The ratio of inflow to outflow in areally large and thin aquifers with uniform well development is the same as prior development. The model will be calibrated on historic water-level data, and will be used as a water management tool. Modeling of successive depletion stages will be investigated. Pumpage input data is the primary control on the digital model. (Popkin - Arizona)
W71-10416

AVERAGE WATER TABLE DECLINE.
High Plains Underground Water Conservation District No. 1, Lubbock, Tex.
For primary bibliographic entry see Field 04B.
W71-10417

ESTIMATING WATER WELL SPECIFIC CAPACITY UTILIZING PERMEABILITY OF DISTURBED SAMPLES,
Patchick (Paul F.), Pebble Beach, Calif.
For primary bibliographic entry see Field 08A.
W71-10421

2G. Water in Soils

QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
Utah Water Research Lab., Logan.
For primary bibliographic entry see Field 05B.
W71-09936

AUGER HOLE SEEPAGE THEORY,
Iowa State Univ., Ames. Dept. of Agronomy., and Iowa State Univ; Ames. Dept. of Physics.
C. W. Boast, and Don Kirkham.
Soil Science Society of America Proceedings, Vol 35, No 3, p 365-373, May-June 1971. 9 p, 8 fig, 1 tab, 22 ref. NSF Grant no. GK-4012, OWRR Project B-002-IA (11).

Descriptors: *Soil water movement, *Unsaturated flow, *Water wells, Hydraulic conductivity, Seepage, Porous media, Infiltration, Potential flow, On-site tests, Flow nets, Equations, Mathematical models.
Identifiers: *Auger holes, Seepage tests.

A new mathematical method for solving the problem of flow to a finite auger hole partially penetrating a water-saturated porous medium allows calculations for auger holes of a wider range of sizes and shapes than previous methods allowed. A table of C-values gives the relationship between the rate of rise of water in the auger hole and the saturated hydraulic conductivity of the surrounding soil. Ernst's approximate formula for C for an auger hole in soil of effectively infinite depth is found valid for a wide range of auger hole shapes and sizes, but Hooghoudt's formula is found useful for only a limited range of auger hole geometries. (Knapp-USGS)
W71-10011

AN ELECTROMETRIC METHOD FOR THE DETERMINATION OF SOIL MOISTURE,
Maharashtra Association for the Cultivation of Science, Poona (India); and J.N. Agricultural Univ., Jabalpur, India, Instrument Development and Service Center.
V. K. Leley, N. J. Sawarkar, and L. K. Badwal.
Analyst, Vol 96, No 1143, p 460-462, June 1971. 3 p, 1 fig, 3 tab, 1 ref.

Descriptors: *Soil moisture, *Moisture content, *Soil mositure meters, Methodology, Test procedures, Alcohols, Water, Sodium chloride, Instrumentation, Resistivity, Electrical conductance.
Identifiers: Specific resistance.

An electrometric method for determining soil moisture, based on the reduction of the specific resistance of propan-2-ol that occurs on addition of moisture is described. The soil sample is shaken with pure propan-2-ol and from the fall in the specific resistance of the filtered extract the percentage of moisture in the soil is read. From the specific resistance of the extract the amount of water extracted can be determined and, therefore, the moisture in the soil can be calculated. The accuracy of such a method for determining soil moisture and its suitability for application to various soils were then examined using six soil samples from different parts of India. The results are presented in tables. The method is rapid, easy to manipulate, does not require the use of complicated or costly instruments and yields results accurate to within 1 percent over a wide range of soil moistures and with a variety of soils. (Woodward-USGS)
W71-10012

A RUNOFF POTENTIAL RATING TABLE FOR SOILS,
Pennsylvania Dept. of Environmental Resources, Harrisburg.
Sie Ling Chiang.
Journal of Hydrology, Vol 13, No 1, p 54-62, April 1971. 9 p, 3 tab, 7 ref.

Descriptors: *Rainfall-runoff relationships, *Soil classifications, *Infiltration, *Soil water movement, Soil texture, Soil physical properties, Percolation, Hydrogeology, Permeability, Drainage, Aerial photography, Photogrammetry, Soil groups, Soil investigations, Soil types.
Identifiers: *Runoff potential (Solids).

A runoff potential rating table based on the soil catena concept is proposed to group soils of similar runoff potential. Seven runoff potential ratings are given according to internal drainage, depth and texture of the soil, as well as subsurface soil conditions. The proposed rating table is to be applied to a detailed soil survey. In the absence of adequate soil reports an air photo analysis approach is also tentatively suggested in conjunction with the use of the proposed system. The rating system enables engineers to classify soils hydrologically. (Knapp-USGS)
W71-10016

VARIATION OF SPECIFIC RETENTION IN RUBBLY ROCK PARTICLES,
Khartoum Univ., (Sudan). Dept. of Geology.
For primary bibliographic entry see Field 02F.
W71-10019

THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
Road Research Lab., Crowthorne (England).
Graham, West, and Michael John Dumbleton.
Quarterly Journal of Engineering Geology, Vol 3, No 1, p 25-40, Dec 1970. 16 p, 2 fig, 6 tab, 26 ref.

Descriptors: *Soil formation, *Weathering, *Leaching, *Tropical regions, *Laterites, Iron, Aluminum, Quartz, Clay minerals, Kaolinite, Illite, Soil-water-plant relationships, Mineralogy.
Identifiers: *Malaysia.

The mineralogy of the processes leading to the formation of soils by the tropical weathering and leaching of rocks is reviewed, and illustrated by the results of an investigation into the formation, mineralogy and plasticity properties of some soils formed on basalt, granite, shale and sandstone in west Malaysia. Hydrolysis followed by differential solution can account for the formation of the samples studied. Kaolinite is always present and generally the dominant clay mineral, although it gives place to gibbsite under severe weathering, and illite is also present in some of the less weathered soils on granite and shale. Quartz is prominent in soils on granite and sedimentary

rocks, which are rich in this mineral. Iron oxide generally occurs usually as goethite in the soils but as hematite in the nodules which were generally present, although gibbsite is the main constituent of the nodules in one case. The mineralogical composition and clay content of the soils are consistent with the range of plasticity properties observed. (Knapp-USGS)
W71-10031

THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
Imperial Coll. of Science and Technology, London (England). Dept. of Civil Engineering.
For primary bibliographic entry see Field 08D.
W71-10032

SOIL CHEMICAL CHANGES AND INFILTRATION RATE REDUCTION UNDER SEWAGE SPREADING,
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
For primary bibliographic entry see Field 05B.
W71-10108

VERTICAL RECHARGE OF UNCONFINED AQUIFER,
Washington Univ., Seattle. Charles W. Harris Hydraulics Lab.
Bruce W. Hunt.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY 7, Paper 8257, p 1017-1030, July 1971. 14 p, 7 fig, 2 tab, 10 ref, append.

Descriptors: *Infiltration, *Seepage, *Groundwater recharge, *Soil water movement, *Unsteady flow, Linear programming, Dupuit-Forchheimer theory, Percolation, Groundwater movement, Mathematical models, Numerical analysis, Aquifers.
Identifiers: *Vertical recharge.

Linearized, unsteady seepage solutions are obtained for some flows which result when groundwater percolates vertically downward to the water table. Solutions are given for the case when the recharge water is spread uniformly over both a two-dimensional strip of finite width and a circular region of finite radius. The mathematical solution is compared with experimental results and with a solution obtained from the Dupuit theory. (Knapp-USGS)
W71-10176

VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
California Univ., Berkeley. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02F.
W71-10318

TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
Koninkliyke/Shell-Laboratorium, Amsterdam (Netherlands).
For primary bibliographic entry see Field 05B.
W71-10325

ADSORPTION AND THE RELIABILITY OF TRACE ELEMENTS AS ENVIRONMENT INDICATORS FOR SHALES,
Iowa State Univ., Ames. Dept. of Earth Sciences.
R. D. Cody.
Journal of Sedimentary Petrology, Vol 41, No 2, p 461-471, June 1971. 11 p, 2 fig, 3 tab, 41 ref.

Descriptors: *Sedimentation, *Shales, *Water chemistry, *Adsorption, *Trace elements, Paleohydrology, Paleoclimatology, Clay minerals, Clays, Deposition (Sediments), Environment.
Identifiers: Environmental indicators.

Adsorption on clay minerals greatly affects the reliability of trace elements as environment indicators for shales. Adsorption and fixation depend on many factors related to the clay minerals in the shales, to the specific trace elements involved, and to numerous characteristics of the depositional environment. No simple relationship can exist between an element's concentration in shales and a single environmental parameter such as paleosalinity. No trace element can be considered an ideal indicator; boron seems to be one of the best but it has only limited value. Experiments on clay sorption combined with analyses of recent sediments may locate trace elements whose sorption is affected chiefly by single environmental parameter and which possess other necessary qualifications for environment indices. These elements should provide criteria for determining major variations in an environmental parameter, but they can probably never be used to detect minor variations. (Knapp-USGS)
W71-10333

NONDESTRUCTIVE WATER CONTENT DETERMINATION,
Tippetts-Abbett-McCarthy-Stratton, New York; and Brooklyn Coll., New York. Dept. of Geology.
Walter D. Jones.
Geological Society of America Bulletin, Vol 82, No 5, p 1377-1379, May 1971. 3 p, 2 fig, 4 ref.

Descriptors: *Soil water, *Soil moisture meters, *Electrical resistance, Resistivity, Laboratory tests, Moisture content.

During the series of compaction tests usually run on embankment material to determine an optimum water content and maximum density of a soil at a standard compactive effort, an electrical resistivity measurement can be made to provide a determination of water content. This method has been tested experimentally and found useful over a range of moisture content below optimum. Soil resistivity decreases with increase in water content and density. Therefore, the dry side of optimum, the simultaneous increase of water content and density enhances the decrease in resistance. This method is, therefore, quite reliable for determining water content on the dry side of optimum. Because water content is a hyperbolic function of cell resistance, the effectiveness of resistance measurement decreases as water content increases. (Knapp-USGS)
W71-10338

EFFECT OF MANURE APPLICATION, AERATION, AND SOIL pH ON SOIL NITROGEN TRANSFORMATIONS AND ON CERTAIN SOIL TEST VALUES,
Wisconsin Univ., Madison. Dept. of Soils.
For primary bibliographic entry see Field 05D.
W71-10357

SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
California Univ., Riverside.
For primary bibliographic entry see Field 03F.
W71-10387

A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
Agricultural Research Service, Reno, Nev. Soil and Water Conservation Research Div; and Nevada Univ., Reno. Nevada Agricultural Experiment Station.
For primary bibliographic entry see Field 04A.
W71-10415

2H. Lakes

INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
Huron River Watershed Council, Ann Arbor, Mich. Inland Lakes and Shoreland Project.
For primary bibliographic entry see Field 04A.
W71-09945

SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
Geological Survey, Baton Rouge, La.
For primary bibliographic entry see Field 05B.
W71-09946

COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
Missouri Univ., Columbia. Dept. of Zoology.
For primary bibliographic entry see Field 05C.
W71-09990

ZOOPLANKTON-PHYTOPLANKTON RELATIONSHIPS IN DEVILS LAKE, NORTH DAKOTA,
North Dakota Univ., Grand Forks. Dept. of Biology.
For primary bibliographic entry see Field 05C.
W71-10063

PARTICLE SIZE, WATER-STABLE AGGREGATES, AND BACTERIAL POPULATIONS IN LAKE SEDIMENTS,
Dalhousie Univ., Halifax (Nova Scotia). Inst. of Oceanography.
For primary bibliographic entry see Field 05C.
W71-10069

A DYNAMIC PROGRAMMING ALGORITHM FOR THE OPERATION OF THE GREAT LAKES,
Department of Energy, Mines and Resources, Ottawa (Ontario). Inland Waters Branch.
For primary bibliographic entry see Field 06B.
W71-10076

DISSOLVED ORGANIC MATTER AND PHYTOPLANKTONIC PRODUCTIVITY IN MARL LAKES,
Michigan State Univ., Hickory Corners. W. K. Kellogg Biological Station.
For primary bibliographic entry see Field 05C.
W71-10079

RECENT AND POSTGLACIAL PRODUCTION RATES OF A MARL LAKE,
Michigan State Univ., Hickory Corners. W. K. Kellogg Biological Station.
For primary bibliographic entry see Field 05C.
W71-10080

DISSOLVED ORGANIC COMPOUNDS AND THEIR UTILIZATION IN TWO MARL LAKES,
Michigan State Univ., Hickory Corners. W.K. Kellogg Biological Station.
For primary bibliographic entry see Field 05C.
W71-10091

CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN: K RASCHETU VODNOGO BALANSA OZ. KHANKA),
M. G. Vas'kovskiy.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 54-62, 1970. 9 p, 3 fig, 3 tab, 4 ref.

Descriptors: *Water balance, *Lakes, *Runoff forecasting, *Inflow, *Discharge (Water), Rivers, Water levels, Water temperature, Water storage, Headwaters, Watersheds (Basins), Precipitation (Atmospheric), Evaporation, Wind velocity, Probability, Overland flow.
Identifiers: *USSR, *Maritime Territory, Lake Khanka.

The amount of flow in Lake Khanka flowing over the drainage divide from the Sungach River depends upon three factors: the height of the water level in the lake, the wind direction and velocity and the height of the divide at the Sungach River source. Surface inflow into the lake between September 1957 and September 1958 was computed from observation data for five rivers flowing into the lake. The amount of runoff for this period was 40.5 cu m/sec. The amount of annual flow of the five rivers between 1925 and 1965 was 50.3 cu m/sec, while total surface inflow into the lake was 56.1 cu m/sec. Runoff from non-gaged sections of the basin was 5.8 cu m/sec or 11.6% of the runoff from the river basins under study. Annual inflow into the lake of 75% and 90% probability will be 42.4 cu m/sec and 30.7 cu m/sec, respectively. Data on flow in the lake from the Sungach River make it possible to calculate the water balance of the lake for this period and to establish real relationships between individual components. (See also W71-10180) (Josefson-USGS)
W71-10186

ORGANIC CARBON AND NITROGEN IN THE SURFACE SEDIMENTS OF LAKES ONTARIO, ERIE, AND HURON,
Department of Energy, Mines and Resources, Burlington (Ontario). Canada Center for Inland Waters.
For primary bibliographic entry see Field 05A.
W71-10327

2I. Water in Plants

INTERRELATIONS OF SEVERAL ABIOTIC FACTORS AND THE HIGHER AQUATIC PLANTS IN A STREAM ECOSYSTEM,
Michigan State Univ., East Lansing, W.K. Kellogg Biological Station.
For primary bibliographic entry see Field 05C.
W71-10036

2J. Erosion and Sedimentation

SEEPAGE FORCE ON INTERFACIAL BED PARTICLES,
Georgia Inst. of Tech., Atlanta. Dept. of Civil Engineering.
Samuel C. Martin, and Mustafa M. Aral.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY 7, Paper 8239, p 1081-1100, July 1971. 20 p, 12 fig, 1 tab, 8 ref, append. OWRR Projects B-004-GA (2) and B-019-GA (2).

Descriptors: *Slope stability, *Stream erosion, *Canal seepage, Scour, Sediment transport, Model studies, Hydraulic models, Seepage, Soil mechanics, Bank stability, Bank erosion, Washouts, Alluvial channels, Sediment-water interfaces.
Identifiers: Seepage forces.

The effective seepage force on cohesionless interfacial bed particles forming a plane bed was determined from the results of slope instability tests and from extrapolation of the results of erosion tests. The seepage flow was perpendicular to the bed and either into or out of the bed. For uniform sand particles ranging from 0.46 mm diam to 0.72 mm diam, the seepage force on the interfacial sand grains was determined from slope instability tests to be one half that on particles well within the bed. Subsequent to the condition of instability for seepage flow vertically upward and into a bed, erosion of the sand bed was measured. From an extrapolation of the results of the erosion tests to a condition of no erosion (which was assumed to correspond to the condition of incipient instability), it is concluded that the seepage force on the interfacial grains is approximately 35% to 40% of that on grains well within the bed. (Knapp-USGS)
W71-09943

CHANNEL PIRACY ON MONTEREY DEEP-SEA FAN,
Scripps Institution of Oceanography, San Diego, Calif.
W. R. Normark.
Deep-Sea Research, Vol 17, No 5, p 837-846, October 1970. 10 p, 5 fig, 1 tab, 13 ref.

Descriptors: *Erosion, *Sedimentation, *Continental shelf, *Continental slope, *Valleys, Density currents, Turbidity currents, Geomorphology, Marine geology.
Identifiers: *Channel piracy (Geomorphology).

The present Monterey Fan-Valley extends 300 km across the Monterey Deep-Sea Fan with a 400 m relief on the upper fan where large levees border the western bank. Seismic reflection profiling on the upper fan suggests that extensive erosion within Monterey Fan-Valley increased its relief by at least 200 m after it had taken over the lower end of the parallel Ascension Fan-Valley. At present, the latter enters the Monterey Fan-Valley as a hanging valley. A beheaded, leveed valley, the Monterey East Fan-Valley, marks the old course of the Monterey Fan-Valley. (Knapp-USGS)
W71-09947

DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
Du Pont de Nemours (E.I.) and Co., Aiken, S.C. Savannah River Lab.
J. C. Corey, and D. W. Hayes.
Deep -Sea Research, Vol 17, No 5, p 917-922, October 1970. 6 p, 5 fig, 12 ref. USAEC Contract AT (07-2)-1.

Descriptors: *BULK DENSITY, *Density, *Nuclear moisture meters, *Bottom sediments, *Cores, Sampling, Instrumentation, Moisture meters, Nuclear meters, Gamma rays, Moisture content, Soil moisture.
Identifiers: *Neutron attenuation densimeters.

Water content and sediment density were measured rapidly and nondestructively at 2.5-cm intervals along a 75-cm long unextruded core (10.75 cm i.d.) using attenuation measurements of collimated gamma rays (0.66 MeV) and collimated fast neutrons (fission spectrum). The gamma sources was 10 mCi of Cs-137, and the fast neutron sources was about 39 mCi of Cf-252. Nondestrucively determined sediment densities and water contents compared well with destructively determined values. (Knapp-USGS)
W71-09950

CALCULATION OF THE MEAN ANNUAL DISCHARGE OF SUSPENDED SEDIMENTS AND ITS CYCLIC FLUCTUATIONS (Russian: Opredeleniye normy i tsiklicheskikh kolebaniy godovogo stoka vzveshennykh nanosov),
N. N. Bobrovitskaya.
In: Sediments and Waste Waters--Their Regime, Theory, Calculation and Measurement (Rezhim, teoriya, metody rascheta i izmereniya nanosov i stochnykh vod), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Gidrologicheskiy Institut Trudy, No 156; Gidrometeoizdat, Leningrad, p 105-123, 1968. 9 p, 4 fig, 4 tab, 15 ref.

Descriptors: *Sediment discharge, *Suspended load, *Sediments, *Hydrologic data, Turbidity, Runoff coefficient, Runoff, Discharge (Water), Correlation analysis, Probability, Meteorological data, Seasonal.
Identifiers: *USSR, North Ossetian ASSR, Ordzhonikidze, Terek River, Correlation coefficient.

It is suggested that the parameters of a series of annual suspended-sediment discharge values be reduced to a long-term period by a graphic analytical method using the relationship of annual discharge of water to suspended sediments. In case of a weak relationship, it is recommended that an analog model of suspended-sediment discharge be prepared. Complex relationships are examined for the suspended-sediment discharge; a relationship is given which links the annual suspended-sediment discharge of the Terek River at Ordzhonikidze to the water discharge and mean rate of spring-flood formation. For the periods 1925-1935, 1936-1944, 1945-1952 and 1952-1963, the coefficients of water discharge for the Terek River at Ordzhonikidze are 0.93, 1.15, 0.94 and 1.02; the coefficients of suspended-sediment discharge for these years are 0.69, 0.90, 0.63 and 1.43, respectively. The cyclic fluctuations in the sediment discharge of the Terek River are shown by a long-term data collection. (Josefson-USGS)
W71-09964

SEDIMENT DISCHARGE OF RIVERS IN THE MARITIME TERRITORY (Russian: Stok nanosov rek Primorskogo kraya),
A. I. Stepanova.
In: Sediments and Waste Waters--Their Regime, Theory, Calculation and Measurement (Rezhim, Teoriya, Metody rascheta i izmereniya nanosov i stochnykh vod), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Gidrologicheskiy Institut Trudy, No 156; Gidrometeoizdat, Leningrad, p 96-104, 1968. 9 p, 3 fig, 4 tab, 5 ref.

Descriptors: *Sediment discharge, *Suspended load, *Discharge (Water), Turbidity, Erosion, Rivers, Watersheds (Basins), Mathematical studies, Probability, Maps.
Identifiers: *USSR, Maritime Territory.

Average long-term suspended sediment discharge of rivers was computed in the Maritime Territory. The variation in annual sediment discharge was examined and compared with the variation in water discharge. A turbidity map, outlining turbidity zones based on values ranging from less than 20 g/cu m to 200 g/cu m, was prepared from long-term observations of sediment discharge through 1965 and compared with similar maps produced in the past. An erosion coefficient map, prepared by K. N. Lisitsyna, outlined three erosion areas in the Territory based on the development of the erosion process; the mean annual erosion coefficients defined for the three areas were 1, 5 and 12 metric tons/sq km. Because of their usefulness, erosion coefficient maps are recommended for determining the suspended-sediment discharge and mean turbidity of unsurveyed rivers. (Josefson-USGS)
W71-09965

PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (Russian: Fotograficheskiy metod granulometricheskogo analiza krupnykh nanosov),
V. V. Romanovskiy, and N. M. Kapitonov.
In: Sediments and Waste Waters--Their Regime, Theory, Calculation and Measurement (Rezhim, teoriya, metody rascheta i izmereniya nanosov i stochnykh vod), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Gidrologicheskiy Institut Trudy, No 156; Gidrometeoizdat, Leningrad, p 64-80, 1968. 17 p, 5 fig, 4 tab.

Descriptors: *Photography, *Bottom sediments, *Particle size, *Sedimentation, Cameras, Sieve analysis, Sediment load, Suspended load, Rivers, Channel morphology, Compaction, Stratification, Bed load, Hydraulic properties.
Identifiers: *USSR, *Krasnodar Kray, *Lake Baykal, Mzymta River, Gonachkir River, Kyzgych River, Bol'shoy Zelenchuk River, Utulik River, Solzan River, Particle size analysis.

A photographic method of grain-size analysis of coarse bottom sediments is described. The method consists of photographing deposits in a floodplain or in a dry section of a riverbed at low water stages and of processing the photographs in a laboratory. A description is given of the procedures used to process the photographs and to calculate the sediment composition. Laboratory and field comparisons of sediment analysis reveal that the photo-

graphic method can be used in place of sieving. Grain-size analyses of compact bottom sediments of the Mzymta, Gonachkhir, Kyzgych, Bol'shoy Zelenchuk, Utulik and Solzan mountain rivers are used to illustrate the applicability of the photographic method. The method requires a minimum of field work, permits accurate sediment analysis over a large areas and provides for analysis of bottom sediments without disturbing their natural state. (Josefson-USGS)
W71-09966

RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (Russian: Nekotoryye rezul'taty laboratornykh issledovaniy skorostey dvizheniya donnykj nanosov),
K. S. Lyubomirova, and G. G. Sheveleva.
In: Problems of Streamflow Regulation and Utilization (Problemy regulirovaniya stoka i ispol'zovaniya rek), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Gidrologicheskiy Institut Trudy, No 160; Gidrometeoizdat, Leningrad, p 140-146, 1968. 7 p, 3 fig, 6 ref.

Descriptors: *Bed load, *Bottom sediments, *Flow rates, *Flumes, *Sediment transport, Roughness (Hydraulic), Froude number, Reynolds number, Particle size, On-site data collections, Dimensional analysis.
Identifiers: *USSR, *Kirghiz SSR, Samur River, Chon-Kizyl-Su River, Atbashi River, Flow kinetics.

Experiments were conducted in a 0.2 x 0.2 x 7m flume of variable gradient to study velocities of 0.83 to 4.3 cm gravel along beds of different roughnesses. The average diameter of the rounded pebble was 2.3 cm and the size of the poorly rounded gravel was 7-10 cm. The method used to interpret the experimental data was based on dimensional analysis. The empirical formula obtained describes the velocity of sediments as a function of flow kinetics, characterized by the Froude number. The formula, which is approximate, may be recommended for flows characterized by a bottom roughness and particle size similar to those in the experiments. As an example, the formula is applied to the bottom sediments of the Samur, Chon-Kizyl-Su and Atbashi Rivers. The results obtained agree well with field observation data. (Josefson-USGS)
W71-09967

RESULTS OF FIELD INVESTIGATIONS AND CALCULATION OF BED-LOAD DISCHARGE OF THE MZYMTA RIVER (Russian: Rezul'taty polevykh issledovaniy i raschet stoka vlekomykh nanosov r. Mzymty),
I. V. Bogolyubova.
In: Sediments and Waste Waters--Their Regime, Theory, Calculation and Measurement (Rezhim, teoriya, metody rascheta i izmereniya nanosov i stochnykh vod), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Gidrologicheskiy Institut Trudy, No 156; Gidrometeoizdat, Leningrad, p 39-63, 1968. 25 p, 4 fig, 11 tab, 12 ref.

Descriptors: *Bed load, *Sediment discharge, *Sediments, *Discharge (Water), *Discharge measurement, Particle size, Turbidity, Bottom sediments, Suspended load, Flow rates, Hydraulic properties, Hydrologic data, Rivers, Reservoirs, Seasonal.
Identifiers: *USSR, Krasnodar Kray, Mzymta River, Competence, Particle size analysis.

Data on the bed-load and suspended-sediment discharge, grain-size distribution and composition of sediments in the Mzymta River were collected during a 6-year period of investigation at the Krasnaya Polyana settlement. The bed-load discharge was obtained from the sediment balance in the body of water, using data on the amount of deposited sediments during the periods between successive series of depth and suspended-sediment discharge measurements at the first and last gaging stations. Measurements reveal a ten-to-one variation in the water discharge of the river (from 11.5 to 116 cu m/sec); a graph of bed-load discharge to water discharge is given, from which the bed-load discharge during the period of investigation is calculated. The data obtained were used to calculate the Mzymta River competence by A. V. Karaushev's method and to check several well-known formulas for calculating bed-load discharges. (Josefson-USGS)
W71-09968

THE MOVEMENT OF BOTTOM SEDIMENTS (Russian: Dvizheniye donnykh nanosov),
K. I. Rossinskiy.
In: Problems of Streamflow Regulation and Utilization (Problemy regulirovaniya stoka i ispol'zovaniya rek), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Gidrologicheskiy Institut Trudy, No 160; Gidrometeoizdat, Leningrad, p 102-139, 1968. 38 p, 13 fig, 12 tab, 15 ref.

Descriptors: *Bottom sediments, *Sediment discharge, *Sediment transport, *Flow rates, *Hydraulics, Particle size, Open channels, Flumes, Settling velocity, Turbulent flow, Saltation, Streambeds, Gravels, Sands, Hydraulic jump, Specific gravity, Mathematical studies, Probability, Reynolds number, Froude number.
Identifiers: *USSR, *Kazakhstan, Kirghiz SSR, Tadzhik SSR, Pebbles, Bottom velocity.

The effect of the fluctuating nature of water flow velocities on the movement of bottom sediment currents in several USSR rivers is examined. The bottom movement of sediments is considered to include particle rolling on the bottom surface and the initial stage of saltation, when the settling velocity of the sediment is still considerably greater than the vertical components of velocities in the near-bottom zone of turbulent flow. Thus, saltating particles cannot be suspended by the flow. During the initial stage of saltation the particles generally rise above the bottom no higher than one diameter. Fluctuations in the water flow velocity affect the velocity of particles moving along the bottom and the continuity of this movement. A method for determining the discharge of heterogeneous sediments is described and calculated values of sand, gravel and pebble sediment discharges are compared with values found by observations on rivers and in the laboratory. (Josefson-USGS)
W71-09969

DYNAMICS OF THE ILI RIVER DELTA (Russian: Dinamika del'ty reki Ili),
R. M. Khaydarov.
In: Problems of Streamflow Regulation and Utilization (Problemy regulirovaniya stoka i ispol'zovaniya rek), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Gidrologicheskiy Institut Trudy, No 160; Gidrometeoizdat, Leningrad, p 189-222, 1968. 34 p, 10 fig, 7 tab, 22 ref.

Descriptors: *Deltas, *Sedimentation, *Sediments, *Channel morphology, *Hydrologic aspects, Meanders, Runoff, Water levels, Hydrography, Lakes, Ice jams, Alluvial channels, Flood plains, Discharge (Water), Flow rates, Silting, Groundwater recharge, Suspended load, Turbidity, Climatic data.
Identifiers: *USSR, *Kazakhstan, Lake Balkhash, Ili River, Channel processes, Competence.

The formation of the Ili River delta was studied using an analysis of current channel processes, aerial photographic surveys, and other topographical data. The delta evolves by repeated shifts of the sediment accumulation zone accompanied by uninterrupted formation of new arms and disappearance of older ones. The cycle of formation and disappearance of delta arms is divided into four stages: formation of a new system, integration of streams into a single channel, intense meandering, and disappearance of the delta system. The full cycle in the evolution of a delta system requires an estimated 200 years. The evolutionary stages of river systems lead to periodic fluctuations in the size of the delta wetted area and to corresponding changes in the runoff losses of the Ili River in its delta. This phenomenon affects fluctuations in the water levels of Lake Balkhash. (Josefson-USGS)
W71-09970

TENTATIVE LABORATORY INVESTIGATION OF DIVAGATING-RIVER BANK DESTRUCTION (Russian: Opyt issledovaniya v laboratornykh usloviyakh razrusheniya beregov (deygisha) na bluzhdayushchikh rekakh),
K. I. Rossinskiy, and G. G. Sheveleva.
In: Problems of Streamflow Regulation and Utilization (Problemy regulirovaniya stoka i ispol'zovaniya rek), Gosudarstvennyy Ordena Trudovogo Krasnogo Znameni Gidrologicheskiy Institut Trudy, No 160; Gidrometeoizdat, Leningrad, p 157-167, 1968. 11 p, 6 fig, 11 ref.

Descriptors: *Bank erosion, *Scour, *Meanders, *Sediment transport, *Model studies, Erosion control, Hydrologic data, Channel flow, Flow rates, Sand bars, Shoals, Flumes, Discharge (Water), Roughness (Hydraulic).
Identifiers: *USSR, Amu Darya River, Channel processes, Divagation, Morphometry, Morphometric data.

The phenomenon of 'deygish,' the destructive undercutting by a river of low, friable banks, causing collapses, detachment of part of the bank deposits and removal of earth masses, is examined for the Amu Darya River of Central and Western Asia. A divagating microriver was simulated in the laboratory by 'natural' means. The first stage of investigations included a study of channel processes, a comparison of experimental and field data and a study of the phenomenon of 'deygish.' The method of simulating the Amu Darya River and the calculation of scale coefficients for the morphometric and hydraulic characteristics of the river are described. The channel process obtained in the model was characterized by active advancement of channel formations, periodic shift of the fairway from one side of the divagating strip to the other and intense bank destruction along several river reaches. The scaled-up scouring velocities proved to be of the same order of magnitude as those measured on the Amu Darya River. The pattern of bank destruction is examined along with the role of shoal and sandbank migration, crosswise sediment transport and sand ridge migration. (Josefson-USGS)
W71-09971

THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
Road Research Lab., Crowthorne (England).
For primary bibliographic entry see Field 02G.
W71-10031

SEDIMENTATION--ANNOTATED BIBLIOGRAPHY OF FOREIGN LITERATURE FOR 1968 and 1969, SURVEY NO. 6,
H. Olaru.
Available as TT70-50050 from Nat. Tech. Inf. Service, Springfield, Va. 22151, $6.00 in paper copy; $0.95 in microfiche. Jerusalem, Israel Program for Scientific Translations, Ltd., 1970. 359 p.

Descriptors: *Sedimentation, *Bibliographies, *Abstracts, *Publications, *Documentation, Sedimentology, Sediment transport, Erosion, Geology, Alluvium, Sedimentary rocks, Particle size, Streamflow, Glaciers, Avalanches, Residual soils.
Identifiers: *Sedimentation bibliography.

This sixth volume of the annotated bibliography contains 1075 entries covering literature on sedimentation published outside the English-speaking world (but including publications in English from non-English-speaking countries). The entries are arranged alphabetically by author. The cumulative subject index covers the preceding five surveys and the present one, which includes material published mostly in 1968, and partly in 1969. The literature

survey covers periodicals, monographs, individual pamphlets and collected papers. The sources used were mainly those available at scientific and technical libraries in Israel. The source languages for this issue were: Armenian, Azerbaijani, Belorussian, Bulgarian, Czech, Dutch, English, Estonian, Flemish, French, Georgian, German, Greek, Hebrew, Hundarian, Italian, Japanese, Lithuanian, Mongolian, Norwegian, Polish, Portugese, Rumanian, Russian, Serbo-Croat, Slovak, Spanish, Swedish, Turkish and Ukrainian. Of the Soviet periodicals used, several exist in cover-to-cover English translations. (Woodard-USGS)
W71-10034

HYDRAULIC CHARACTERISTICS OF THE HYDROMETRIC SECTION AT THE MOUTH OF THE SULINA ARM (French: Caracteristiques hydrauliques de la section hydrometrique a l'embouchure du bras de Sulina),
Institute of Hydrotechnical Research, Bucharest (Rumania).
Constantin Bondar.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 305-317, 1970. 13 p, 11 fig, 4 tab, 12 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Data collections, *Deltas, *Suspended load, *Profiles, *Bed load, Sedimentation, Turbidity, Discharge (Water), Rivers, Stream gages, Gaging stations, Channel morphology.
Identifiers: Danube Delta.

Hydrometric characteristics (velocities, turbidities, specific discharges of carried sediment and granulometry) of the gaging profile in Sulina harbor of the Danube Delta were generalized by processing the load and water discharge and suspended and bed-load granulometry data collected during 1957-58. The distribution graph of the non-dimensional values is separately given for each hydrological element on the profile. (Knapp-USGS)
W71-10043

CALCULATION OF COARSE ALLUVIUM DISCHARGE (SANDS) FROM THE SULINA ARM (French: Calcul de l'ecoulement des alluvions grossieres (sables) a l'embouchure du bras de Sulina),
Institute of Hydrotechnical Research, Bucharest (Rumania).
C. Bondar.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 317-332, 1970. 16 p, 2 fig, 8 tab, 15 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Sediment load, *Bed load, *Suspended load, *Deltas, Discharge (Water), Streamflow, Sands, Stream gages, Gaging stations, Sampling, Sand bars.
Identifiers: *Danube Delta.

The total discharge of coarse sediment carried by the Sulina channel of the Danube in the whole depth of the current was obtained. A. V. Karaushev's theory was compared with the vertical elliptic distribution of the current velocity and the bottom turbidity of the coarse load daily measured on the hydrometrical profile of the Sulina harbor. The results obtained agree with the coarse sediment volumes (sands) dredged on the bar off the Sulina mouth. (Knapp-USGS)
W71-10044

METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
Transcaucasian Scientific Hydrometeorological Research Inst., Baku (USSR). Sea Lab.
For primary bibliographic entry see Field 02L.
W71-10045

THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
Department of Energy, Mines and Resources, Ottawa (Ontario). Inland Waters Branch.
For primary bibliographic entry see Field 02C.
W71-10048

ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
Department of Energy, Mines and Resources, Ottawa (Ontario). Inland Waters Branch.
For primary bibliographic entry see Field 02C.
W71-10049

REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
Egyptian Desert Inst., Cario.
For primary bibliographic entry see Field 02F.
W71-10051

GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN: THE GREAT BASIN, U.S.A.,
Geological Survey, Salt Lake City, Utah., and Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 02F.
W71-10052

THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (French: L'influence des travaux d'amenagement sur la morphologie des bras du Delta du Danube),
Institute of Hydrotechnical Research, Bucharest (Rumania).
For primary bibliographic entry see Field 08B.
W71-10059

STUDIES OF THE DISPOSITION OF PARTIAL DISCHARGES OF BED LOAD UPSTREAM OF THE SULINA MOUTH (French: Etudes des dispositifs de dechargement partiel du debit solide en amont de l'embouchure de Sulina),
For primary bibliographic entry see Field 08B.
W71-10060

LONGITUDINAL DISPERSION OF BED-MATERIAL PARTICLES,
Illinois State Water Survey, Urbana; and Illinois Univ., Urbana. Water Resources Center and Iowa Univ., Iowa City. Dept. of Mechanics and Hydraulics.
Chih Ted Yang, and William W. Sayre.
Supported by U.S. Geological Survey. ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY7, Paper 8228, p 907-921, July 1971. 15 p, 4 fig, 1 tab, 11 ref, append.

Descriptors: *Bed load, *Dispersion, *Sediment transport, *Stochastic processes, Probability, Statistical models, Mathematical models, Tracers, Numerical analysis, Turbulent flow.
Identifiers: *Particle movement (Bed load).

The movement of sediment particles is expressed in terms of steps and rest periods. A set of difference equations based on the Aris moment transformation, and used previously for the longitudinal dispersion of suspended particles, is modified to find the distribution functions of step length and rest period of tracer particles moving along an alluvial bed for a given flow condition. This study indicates that the rest periods follow an exponential distribution function. The comparison between the numerical solution of Aris' moment equations and Yang's general one-dimensional stochastic model indicates that both models lead to the same solution for the same condition. (Knapp-USGS)
W71-10169

PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
Connecticut Univ., Storrs. Dept. of Civil Engineering; and Rocky Mountain Hydraulic Lab., Allensport, Colo.
For primary bibliographic entry see Field 08A.
W71-10175

ANALYSIS OF SEDIMENTATION DATA,
Norges Tekniske Hoegskole, Trondheim. Institutt for Anleggsdrift og Havnebygging.
Udayagiri Mohan Rao.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY4, p647-652, April 1971. 6 p, 10 ref, append.

Descriptors: *Settling velocity, *Sedimentation, *Reynolds number, *Particle shape, Data processing, Particle size, Sediments, Viscosity, Roughness (Hydraulic).
Identifiers: *Sedimentation data.

The ratio of the particle-settling-velocity in the fluid under consideration to that of a sphere of the same volume and density falling under the same force field in a fluid chosen as a standard for comparison, is the settling velocity ratio. The relative magnitude of the inertial and viscous resistances to the sphere falling in the standard fluid is the standard Reynolds number, used to facilitate comparison of different combinations of the fluid and solid properties. If sedimentation data are presented as a plot of settling velocity ratio versus standard Reynolds number there are at least two advantages: (1) Shape effects are accurately described by the choice of sphericity as the shape expression; and (2) the plot is more readily usable than the drag-Reynolds number. The effects of the other variables may be examined by varying the other parameters. (Author)
W71-10315

FLOOD FLOW DOWNSTREAM FROM SLIDE,
Geological Survey, Fort Collins, Colo. Water Resources Div.
Harold P. Guy.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY4, p 643-646, April 1971. 4 p, 1 fig, 2 ref.

Descriptors: *Landslides, *Floods, *Excessive precipitation, *Cloudbursts, *Virginia, Mudflows, Mud, Storms, Historic flood, Urbanization, Storm runoff, Surface runoff, Washouts, Mass wasting, Debris avalanches.
Identifiers: Roseland (Va).

A study was made of the effects of a landslide of the soil avalanche type from a wooded hillside on the flow rate of a small stream near Roseland, Va. The slide occurred on the night of August 19-20, 1969, during a very intense rainstorm estimated at 20 inches in less than 4 hr. The slide, containing more or less 57,000 cu ft of soil, apparently moved down the 40% slope nearly en masse. Also, the slide material was to a highly liquefied mudflow by the time it reached the measurement site 300 ft downstream. Such liquefaction was probably caused mostly by the highly saturated condition of the soil prior to the slide. The slide dammed the relatively clear water flowing (estimated to be about 500 cfs) in the east tributary for a few seconds. This temporary dam subsequently broke, allowing the backed up flow to move downstream along the left bank. It is likely that the peak flow rate at the bend draining a 20-acre drainage area may have been about 8,000 cfs. This is 16 times that estimated as possible from precipitation excess alone. Had such a slide and subsequent flow occurred in an urban area, the destruction in the area of the slide itself would have been only a small part of the total environmental destruction. (Knapp-USGS)
W71-10316

DEPOSITION OF DEEP-SEA SANDS: COMPARISON OF TWO AREAS OF THE CAROLINA CONTINENTAL RISE,
Duke Univ., Durham, N.C. Marine Lab.
Michael E. Field, and Orrin H. Pilkey.
Supported by U.S. Geological Survey and National Science Foundation. Journal of Sedimentary Petrology, Vol 41, No 2, p 526-536, June 1971. 11 p, 5 fig, 1 tab, 34 ref.

Descriptors: *Bottom sediments, *Continental slope, *Sedimentation, *Sediment transport, Sands, Turbidity currents, Currents (Water), Sedimentary structures, Cores, Deposition (Sediments), Density currents.
Identifiers: *Submarine canyons.

Twenty-eight cores were investigated to compare and contrast the sediments and sedimentary processes in two adjacent but topographically distinct portions of the Carolina continental rise. Cores were collected from both the high relief portion of the continental rise encompassing the Hatteras Canyon-Hatteras Outer Ridge system and the adjacent relatively smooth and uncomplicated portion of the continental rise to the south. Sand grains are concentrated in distinct sand layers and laminae in the entire study area, but the characteristics of the sand layers are distinctly different in the two regions. Sand layers from the Hatteras Outer Ridge-Hatteras Canyon system are abundant, often graded, poorly sorted, and contain shallow water shells and unique occurrences of pyrite cementation. In contrast, the sand layers and laminae from the continental rise adjacent to the ridge-canyon system are less abundant, not graded, better sorted, and finer in grain-size than the ridge-canyon sand layers. Light mineral assemblages from both regions indicate a source north of Cape Hatteras. Turbidity current transportation is important only in the canyon system. To the south, lateral flowing bottom currents are responsible for secondary transportation of sediments originally introduced via rapid downslope movement and slow settling. This two-step process of sediment transport is a major contributor of material for Quaternary mantling of the continental rise south of Cape Hatteras and probably as well for the Blake-Bahama Outer Ridge. (Knapp-USGS)
W71-10328

DURABILITIES OF SAND SIZE SCHIST AND 'VOLCANIC' ROCK FRAGMENTS DURING FLUVIAL TRANSPORT, ELK CREEK, BLACK HILLS, SOUTH DAKOTA,
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Geological Sciences; and Oklahoma Univ., Norman. School of Geology and Geophysics.
Kenneth L. Cameron, and Harvey Blatt.
Journal of Sedimentary Petrology, Vol 41, No 2, p 565-576, June 1971. 12 p, 10 fig, 2 tab, 12 ref. NSF Grant No GP-4042.

Descriptors: *Sediment transport, *Alluvial channels, *Particle size, *Abrasion, Sands, Gravel, Igneous rocks, Particle shape, Bed load, Weathering, Mineralogy, South Dakota, Provenance, Sedimentation.
Identifiers: *Black Hills (SD), Schists.

Elk Creek is 120 stream miles long and flows eastward from the northern Black Hills to join the Cheyenne River. The drainage basin encloses 601 sq. mi. of which 95.1% is underlain by Paleozoic and Mesozoic sedimentary rocks, 2.3% by Precambrian metamorphic rocks, and 1.8% by Tertiary felsitic siliceous volcanic rocks. Cenozoic terrace gravels overlie approximately 25% of the sedimentary rocks. A detailed petrographic examination of sand-sized sediment in Elk Creek reveals: (1) most schist fragments are mechanically destroyed by less than 15 miles of transport in the high gradient portion of the stream; (2) volcanic rock fragments are durable and there is no noticeable loss from mechanical abrasion during the initial 100 miles of transport; and (3) rounding of volcanic rock fragments due to mechanical abrasion occurs only in sediment coarser than 1mm. (Knapp-USGS)
W71-10329

WIND-ORIENTED GASTROPOD SHELLS AS INDICATORS OF PALEOWIND DIRECTION,
North Dakota Univ., Grand Forks. Dept. of Geology.
J. Mark Erickson.
Journal of Sedimentary Petrology, Vol 41, No 2, p 589-593, June 1971. 5 p, 5 fig, 12 ref.

Descriptors: *Dunes, *Sedimentary structures, Wind velocity, Snails, Abrasion, Erosion, California, Scour, Sediment transport.
Identifiers: *Paleocurrent indicators, *Sand dunes.

The stoss face of a large parabolic dune at Dillon Beach, California, is being actively eroded by wind action. The result is formation of a lag deposit consisting largely of shells of a heliciform, terrestrial gastropod. Wind velocities up to thirty miles per hour serve to orient many of these sand-filled shells with aperture away from the prevailing wind direction. In addition, sandblasting by saltating grains produces a wedge-shaped abrasion or decortication pattern on the spire of the shell with the wedge pointing downwind. Wind-oriented gastropod shells and decortication wedges may be useful criteria for determination of paleowind directions in ancient dune deposits. (Knapp-USGS)
W71-10330

BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
Illinois Univ., Chicago.
Norman D. Smith, and Frances J. Hein.
Journal of Sedimentary Petrology, Vol 41, No 2, p 598-602, June 1971. 5 p, 2 fig, 2 ref.

Descriptors: *Sedimentary structures, *Sands, *Alluvium, *Burrows, *Insects, Bed load, Flood plains, Alluvial channels, Insect behavior, Ripple marks.
Identifiers: *Beetles, *Bioturbation.

Through their burrowing activities, the staphylinid beetles Bledius pallipennis and B. bellicosus remove significant quantities of loose, easily eroded sand from beneath cohesive surficial layers. The combined seasonal activities of both species result in an estimated 5.1 mm new layer of reworked sand in certain exposed areas of the braided lower Platte and Loup Rivers in eastern Nebraska. (Knapp-USGS)
W71-10331

SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
Rice Univ., Houston, Tex.
Clifton F. Jordon, Jr., Glenn E. Fryer, and Elze H. Hemmen.
Journal of Sedimentary Petrology, Vol 41, No 2, p 489-496, June 1971. 8 p, 4 fig, 4 tab, 15 ref. NSF Grant GP-3600.

Descriptors: *Particle size, *Hydrometers, *Settling velocity, Particle shape, Silts, Clays, Suspension, Analytical techniques, Instrumentation, Sedimentology.
Identifiers: *Hydrophotometers.

The photo-extinction method of fine particle size analysis by hydrophotometer is significantly faster and more precise than pipette analysis. Six samples are analyzed per hour by the hydrophotometer and calculations can be performed by computer in fifteen minutes. Hydrophotometer reproducibility, expressed as the standard deviation of phi percentiles of the cumulative curve is 0.11 phi, whereas that of the pipette method is 0.45 phi. Precision of both methods increases, in the course of analysis, from silt to clay; and the ranges of precision, respectively, are 0.07-0.36 phi and 0.06-1.69 phi. Sample treatment for the hydrophotometer analysis is non-destructive (no sample drying) and great versatility in the nature of the settling medium and dispersant is possible. (Knapp-USGS)
W71-10332

ADSORPTION AND THE RELIABILITY OF TRACE ELEMENTS AS ENVIRONMENT INDICATORS FOR SHALES,
Iowa State Univ., Ames. Dept. of Earth Sciences.
For primary bibliographic entry see Field 02G.
W71-10333

STREAM BANK FAILURE AND ROTATIONAL SLUMPING: PRESERVATION AND SIGNIFICANCE IN THE GEOLOGIC RECORD,
Southern Methodist Univ., Dallas, Tex. Dept. of Geological Sciences.
Robert L. Laury.
Geological Society of America Bulletin, Vol 82, No 5, p 1251-1266, May 1971. 16 p, 10 fig, 1 tab, 27 ref.

Descriptors: *Bank stability, *Landslides, *Sedimentary structures, Soil mechanics, Erosion, Scour, Sedimentation, Mass wasting, Land subsidence.
Identifiers: *Slumping, *Stream bank failure.

Evidence of stream bank failure in the geologic record is meager. Observations on modern stream bank failure and on ancient analogs suggest that bank failures most likely to be preserved in the stratigraphic record are those produced by large-scale shear failure--in particular, by rotational slumping. Preservation is most easily accomplished by the type of rotational slumping in which base failure, rather than slope failure, is involved. Base failure is manifest by large slump blocks with surfaces of failure passing below the local thalweg and, therefore, below the depth of active stream scouring; preservation of at least subthalweg parts of slumped masses is possible. Areas of active scouring in which banks and thalwegs are cut in very cohesive silt- and clay-rich sediments favor the occurrence of deep rotational slumping and possibly base failure. Such conditions are more common in low-energy deltaic plain or tidal flat environments than in alluvial valleys. (Knapp-USGS)
W71-10334

PUGET PEAK AVALANCHE, ALASKA.
Ohio State Univ., Columbus. Dept. of Geology.
Marcus C. Hoyer.
Geological Society of America Bulletin, Vol 82, No 5, p 1267-1284, May 1971. 18 p, 12 fig, 1 tab, 18 ref. Army Res. Office, Contract DA 31-143-AROD-280.

Descriptors: *Avalanches, *Landslides, *Rockslides, *Earthquakes, *Waves (Water), *Alaska, Debris avalanches, Glaciers, Snowpacks, Erosion, Seiches, Geology, Ice, Snow.
Identifiers: *Puget Peak (Alaska).

The Alaska earthquake of March 27, 1964, caused several phenomena at the head of Puget Bay in south-central Alaska. A large rock-snow avalanche fell from Puget Peak and slid into the bay. Sea waves struck the coast, transporting debris inland to elevations of 7 m. The Puget Peak avalanche transported 1.8 million cu m of rock, snow, soil, and plant debris downslope. The avalanche began as a large rockfall of jointed and fractured bedrock from Puget Peak. The rockfall reached the cirque traveling at a speed of more than 100 kph; there, it set in motion a large volume of snow. Most of the debris was deposited on the beach and in the bay. The avalanche mass slid on snow, soil, and rock from the cirque to the bay. Evidence along the avalanche track indicates that the avalanche mass traveled at high speed along its entire extent. Similar avalanches have occurred at Puget Bay in the past and will occur again, because shattered bedrock and steep slopes remain on Puget Peak. (Knapp-USGS)
W71-10335

BIOCLASTIC TURBIDITE SEDIMENTATION IN COLUMBUS BASIN, BAHAMAS,
Duke Univ., Durham, N.C. Marine Lab.
Brian D. Bornhold, and Orrin H. Pilkey.

Geological Society of America Bulletin, Vol 82, No 5, p 1341-1354, May 1971. 14 p, 15 fig, 3 tab, 31 ref.

Descriptors: *Turbidity currents, *Stratigraphy, *Sedimentation, Sands, Suspended load, Provenance, Sediment transport, Carbonates, Carbonate rocks, Limestones.
Identifiers: *Bioclastic sediments, *Bahamas.

Thirty closely spaced piston cores from Columbus Basin, a 2700-sq mi re-entrant in the Great Bahama Bank, were studied in an effort to describe, in detail, the morphologics and lateral changes in faunal and floral composition, texture, internal structures, and mineralogy of individual bioclastic turbidites. Correlation was based on the color of the pelagic units, the relative and absolute positions of the turbidites in the cores, the absolute ages of the pelagic sediments, the coiling ratios of Globorotalia truncatulinoides, the Globorotalia menardii complex, and the thickness, composition, and texture of the turbidites. Turbidity currents, originating on the upper parts of the steep slopes of the shallow carbonate banks, have flowed a maximum of 15 mi into the basin from the northeast and the northwest. The individual flows are tongue shaped, and the thickest portions are near the head of the flow. Relatively little fine material is deposited in the basin by turbidity currents. (Knapp-USGS)
W71-10336

SIMULATION MODEL OF STREAM CAPTURE,
Virginia, Univ., Charlottesville. Dept. of Environmental Sciences.
For primary bibliographic entry see Field 02E.
W71-10337

WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (Rossypi sloya volnovoy pererabotki i ikh geneticheskiye osobennosti).
Akademiya Nauk SSSR, Moscow. Institut Okeanologii.
Yu. D. Shuyskiy.
Akademiya Nauk SSSR Doklady, Seriya Geologiya, Vol 196, No 6, p 1430-1433, 1971. 4 p, 1 fig, 11 ref.

Descriptors: *Placer mining, *Sediment transport, *Waves (Water), *Sediments, *Shores, Hydrogeology, Deposition (Sediments), Beach erosion, Sand bars, Geomorphology, Mineralogy, Flow, Particle size.
Identifiers: *USSR, *Placers, Mechanical concentrations.

A study was made of beach placers formed as a result of the flow of sandy sediments. Depending upon the bottom gradient and the nature of the wave action, five basic types of deposits may be distinguished: (1) deposits on a high-gradient sandy shore; (2) deposits on a high-gradient shoal; (3) deposits on a gentle-gradient sandy shore; (4) reworked storm-swept deposits on a high-gradient shoal; and (5) reworked storm-swept deposits on a gentle-gradient sandy shore. The wave-formed deposits, which are the sites of mechanical concentrations, are the first stage in the development of all beach placers, regardless of their age and mode of occurrence. These placers differ from other genetic types by their mobility, recovery capacity, and formation which is free of the immediate effects of tectonic and eustatic factors. (Josefson-USGS)
W71-10340

MORPHOLOGICAL CHARACTERISTICS OF BRAIDED RIVER CHANNELS IN AN AREA OF TRIBUTARY INFLOW (K voprosu o morfologicheskikh osobennostyakh mnogorukavnykh rechnykh rusel na uchastke vpadeniya pritoka),
State Hydrological Inst., Leningrad (USSR).
I. V. Popov, and B. F. Snishchenko.
Meteorologiya i Gidrologiya, No 1, p 48-64, January 1971. 17 p, 9 fig, 6 ref.

Descriptors: *Channel morphology, *Braiding, *Deposition (Sediments), *Rivers, Alluvial channels, Meanders, Deltas, Flow rates, Inflow, Flood plains, Hydrography, Water levels, Geomorphology, Estuaries.
Identifiers: *USSR, Amur River, Ussuri River, Sungari River, Water Regime, Anabranches.

The Amur River reach which includes the Tarabarov and Bol'shoy Ussuriyskiy Islands and the Pryamaya, Bezumka, Kazakevicheva and Amurskaya anabranches is a typical braided flood plain of the middle Amur and of the upper part of the lower Amur. The water regime of the Kazakevicheva, Amurskaya and Pryamaya anabranches is determined by the water regime of the Amur and not by that of the Ussuri, which points to their affiliation with the Amur River system. The formation of the Tarabarov and Bol'shoy Ussuriyskiy Islands and of the Kazakevicheva anabranch is due entirely to the activity of the Amur River. The Amurskaya anabranch is a natural continuation of the Kazakevicheva channel. The reaches of the main channel of the Amur and its anabranches tend to form new channels which eventually attain the size of the main channel. A movement of large accumulations of sediments forming channel braiding is observed in the main channel and in the large anabranches (Pryamaya, Kazakevicheva, Amurskaya). A complex secondary system of anabranches is developed on the flood plain. Little change has taken place in the location of the Ussuri River mouth in centuries and no significant influence of the Ussuri tributary on the Amur braided flood plain has been established. (Josefson-USGS)
W71-10343

MUD FLOW OCCURRENCES IN THE RSFSR (Rasprostraneniye seley na territorii RSFSR),
Moscow State Univ. (USSR). Research Lab. for Snow Slides.
V. F. Perov, and N. V. Tumel'.
Vestnik Moskovskogo Universiteta: Geografiya, No 3, p 28-35, May-June 1968. 8 p, 1 fig, 12 ref.

Descriptors: *Mudflows, *Snowpacks, *Mud-water interfaces, *Sediment-water interfaces, Glaciers, Snow, Ice, Volcanoes, Climatic data, Orography, Permafrost, Rain, Snowmelt, Maps, Topography.
Identifiers: *RSFSR, Caucasus, Sakhalin Island, Kamchatka, Siberia, Urals, Kola Peninsula, Altay Mountains, Baykal region.

A map of mudflow distribtuion, reflecting the genetic types of mudflows and the intensity of their development, has been prepared for the RSFSR. The following types of mudflows and mudflow combinations are distinguished: (1) pluvial, (2) snowmelt, (3) glacial, (4) pluvial-snowmelt (mixed), and (5) flows resulting from the melting of perennial snow and ice during volcanic eruptions. The conditions and peculiarities of mudflow phenomena are outlined for major physico-geographical areas: (1) the Kola Peninsula (nival, water and stone mudflows), (2) the Northern Caucasus (glacial and pluvial), (3) the Urals (nival, water and stone), (4) the Putorana Mountains (nival, water and stone), (5) northeastern Siberian mountains (pluvial-snowmelt), (6) the Altay and Kuznetsk Ala-Tau Mountains (mixed, pluvial and glacial), (7) the Sayan and Tuva mountainous region (pluvial), (8) the Baykal mountainous country (mixed and pluvial), (9) mountains of the Far East (pluvial) and Sakhalin Island (pluvial-snowmelt), and (10) the Kamchatka Peninsula (flows formed from volcanic eruptions). (Josefson-USGS)
W71-10351

ABSENCE OF DOWNSTREAM TRANSPORT OF ALLUVIUM BY DOWNCUTTING RIVERS, AS ILLUSTRATED BY THE GAR' RIVER (Otsutstviye prodol'nogo perenosa allyuviya vrezayushcheysya reki na primere r. Gar'),
V. E. Murzayeva.
Vestnik Moskovskogo Universiteta: Geografiya, No 3, p 118-122, May-June 1968. 5 p, 1 fig, 3 tab.

Descriptors: *Sediment transport, *Alluvium, *Channel morphology, Channel flow, Sands, Bedrock, Channel erosion, Gold, Rocks, Placer mining, Geomorphology, Valleys, Petrography, Mineralogy.
Identifiers: *USSR, *Khabarovsk Territory, Selemdzha River, Gar' River, Pebbles.

The close relationship between the compositions of alluvial pebbles and sand, and that of local bedrock, may point to a virtually complete lack of downstream transport of sand and pebbles in the lower reaches of the present-day channel of the Gar' River (lower Selemdzha River basin). The probable reason for this is the presence of local base levels of erosion in stepped sections of the longitudinal profile. These base levels impede the free downstream movement of material. The coarse-detrital alluvium of the Gar' River is apparently transported only during lateral shifts of the channel. These shifts are very limited, judging from the small width of the floodplain which is often constricted between steep slopes. It may be inferred that the gold, which reaches the channel from the nearby original sources or directly from the valley-floor rocks, cannot be carried far to form gradually poorer placers. Only short, rich placers, almost coinciding in space with the original gold-bearing bedrock of the valley, should be expected under such conditions. (Josefson-USGS)
W71-10352

EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (Vliyaniye erozionnogo vreza rechnykh dolin na razvitiye karsta),
All-Union Designing, Surveying and Scientific Research Inst., Leningrad (USSR).
S. Ya. Zhukovskiy.
Vestnik Moskovskogo Universiteta: Geografiya, No 3, p 123-128, May-June 1968. 6 p, 2 fig, 2 ref.

Descriptors: *Karst, *Valleys, *Erosion, *Carbonate rocks, *Alluvium, Bedrock, Geomorphology, Limestones, Groundwater, Surface waters, Dolomite, Caves.
Identifiers: *USSR, Russian Platform, Onega River, Dnieper River, River valleys.

In surveying karstic areas for building hydraulic power stations, attention should be paid to the history of river valleys which exhibit ancient and recent erosional downcutting. Valleys showing shallow and recent downcutting in the overlying sedimentary bed require a limited amount of work, primarily for determining the depth of calcareous rocks. It is important to study the stretches of a river valley contiguous to massifs of soluble rocks, which often display advanced karst. Examples are given of karst areas in the middle reaches of the Onega River and the lower reaches of the Dnieper River. (Josefson-USGS)
W71-10353

CHAPTER III. Sediment measurement techniques3 reservoir deposits.
American Society of Civil Engineers, New York.
For primary bibliographic entry see Field 07B.
W71-10392

2K. Chemical Processes

QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
Utah Water Research Lab., Logan.
For primary bibliographic entry see Field 05B.
W71-09936

DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
New Hampshire Univ., Durham. Inst. of Natural and Environmental Resources.
For primary bibliographic entry see Field 05B.
W71-09942

SILICATE-SEA WATER EQUILIBRIA IN THE OCEAN SYSTEM,
California Univ., Berkeley. Dept of Geology and Geophysics; and Northwestern Univ., Evanston, Ill. Dept. of Geological Sciences.
Harold C. Helgeson, and Fred T. MacKenzie.
Deep-Sea Research, Vol 17, No 5, p 877-892, October 1970. 16 p, 3 fig, 2 tab, 42 ref. Northwestern Univ. Grant SDC 17; NSF Grant GA 11285.

Descriptors: *Water chemistry, *Sea water, *Silicates, Clay minerals, Carbonates, Hydrogen ion concentration, Mineralogy, Weathering.
Identifiers: *Silicate-sea water reactions.

The ocean system can be viewed as a composite of local equilibrium states involving sea water and sedimentary material of variable composition. The chemical potentials of the major chloride components of sea water are functions solely of temperature and pressure in the present ocean. This behavior decreases the maximum number of phases that may coexist at equilbrium in the system. Stability fields of aluminiosilicates (including a mixed-layer illite-montmorillonite solid solution) in a nine component model of the system can be depicted on isothermal-isobaric activity diagrams in terms of pH and activity of H4Si04. Because these variables change significantly with depth and geographic position in the ocean, the equilibrium composition of the mixed-layer phase also changes, becoming less illitic with increasing depth. Quantitative consideration of equilibria in the present ocean provides a frame of reference for investigation of the chemical evolution of sea water and the mass transfer involved in silicate-sea water reactions through geologic time. (Knapp-USGS)
W71-09948

TIME VARIATION OF THE DEPTH OF A HIGH SALINITY LAYER IN THE CELTIC SEA,
University Coll. of North Wales, Bangor. Marine Science Labs.
J. Darbyshire.
Deep-Sea Research, Vol 17, No 5, p 903-911, October 1970. 9 p, 8 fig, 3 ref.

Descriptors: *Salinity, *Sea water, *Variability, Bathymetry, Density stratification, Stratified flow, Tides, Tidal effects, Currents (Water), Waves (Water), Water circulation.
Identifiers: *Celtic Sea.

During July-August 1968, a relatively high salinity layer of 5-10 m thickness was found at a depth of 25-40 m in the Celtic Sea at a point approximately 60 nautical miles ESE of Cork. The height of this layer from the bottom showed a time variation with tidal period in phase with the tidal height variation. These variations may be due to internal waves or to the layer sloping downwards towards the land so giving rise to a periodic variation of depth at one point due to the to and fro motion of the tide. (Knapp-USGS)
W71-09949

NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
Union Carbide Corp., Tuxedo, N.Y. Sterling Forest Research Center.
For primary bibliographic entry see Field 01B.
W71-09974

THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
State Oceanographic Inst., Moscow (USSR).
A. I. Simonov, B. M. Zatuchnaya, E. P. Kirilliva, and S. K. Revina.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 339-342, 1970. 4 p. (Also published in IASH Publication No 91, 1970).

Descriptors: *Water chemistry, *Mixing, *Saline water intrusion, *Deltas, Stratified flow, Saline water-freshwater interfaces, Salinity, Biochemistry.

This report presents the results of investigations into hydrochemical processes taking place at river mouths where river and sea water mix. The hydrochemistry of river mouths is a function of the interaction of river and sea water, especially the formation of the salinity (density) wedge as well as hydrochemical and biochemical processes. The salinity interface is also the interface for all other hydrochemical characteristics. An equation is derived relating salinity and chlorine content. The model is developed for short-period changes of gases, pH, and biogenic substances. The features of the spatial distribution of hydrochemical characteristics under different hydrometeorological conditions are discussed. (Knapp-USGS)
W71-10046

WATER QUALITY MODELING OF ESTUARIES,
Water Resources Engineers, Inc., Walnut Creek, Calif.
For primary bibliographic entry see Field 05G.
W71-10047

CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (French: Considerations sur l'interaction entre les eaux de surface et souterraines du territoire du Delta du Danube),
Institutul de Medicina se Farmacia, Iasi (Rumania). Catedra de Igiena.
For primary bibliographic entry see Field 05B.
W71-10054

DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
Department of Energy, Mines and Resources, Burlington (Ontario). Inland Waters Branch.
For primary bibliographic entry see Field 07B.
W71-10072

TRACE ELEMENTS IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10190

MERCURY IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10191

STRONTIUM IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10192

COPPER IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10193

MANGANESE IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10194

MAGNESIUM IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10195

ZINC IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10196

'POLYWATER' AND SWEAT: SIMILARITIES BETWEEN THE INFRARED SPECTRA,
Bell Telephone Labs., Murray Hill, N.J.
For primary bibliographic entry see Field 01B.
W71-10322

COPPER/BICARBONATE EQUILIBRIA IN SOLUTIONS OF BICARBONATE ION AT CONCENTRATIONS SIMILAR TO THOSE FOUND IN NATURAL WATER,
Water Pollution Research Lab., Stevenage (England).
For primary bibliographic entry see Field 05A.
W71-10323

BIMODAL DISTRIBUTION OF pH VALUES OF THERMAL SPRINGS OF THE WORLD.
Indiana Univ., Bloomington. Dept. of Microbiology.
Thomas D. Brock.
Also supported by grant National Science Foundation. Geological Society of America Bulletin, Vol 82, No 5, p 1393-1394, May 1971. 2 p, 1 fig, 1 tab, 1 ref. USAEC Contract COO-1804-27.

Descriptors: *Hot springs, *Thermal water, *Mineral water, *Water chemistry, Hydrogen ion concentration, Data collections, Sulfates, Bicarbonates.
Identifiers: Thermal springs.

Frequencies of thermal springs of various pH values are given for the main thermal areas of Yellowstone Park, other parts of the western United States, New Zealand, and Iceland. A bimodal distribution curve was obtained for many springs with pH values of 2-4 and 7-9 but relatively few in between. These data provide quantitative evidence for the existence of two main kinds of thermal springs: acid sulfate and neutral bicarbonate. (Knapp-USGS)
W71-10339

GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K geokhimii alyuminiya v zone energichnogo gidroliticheskogo razlozheniya alyumosilikatov v korakh vyvetrivaniya).
Vsesoyuznyi Nauchno-Issledovatelskii Institut Mineralnogo Syrya, Moscow (USSR).
I. G. Ganeyev, and V. A. Tenyakov.
Akademiya Nauk SSSR Doklady, Seriya Geologiya, Vol 196, No 6, p 1434-1437, 1971. 4 p, 15 ref.

Descriptors: *Geochemistry, *Alkalis (Bases), *Aluminum, *Hydrolysis, *Weathering, Laterites, Chemical properties, Hydrogen ion concentration, Alkalinity, Ions, Chemical reactions, Water structure, Crystals.
Identifiers: *USSR, Aluminosilicates, Gibbsite.

The basic quantum-chemical properties of Al (3) ions, the formation of various aluminum hydroxide compounds and the composition and structure of aluminum ions in a wide range of temperatures, pressures, and pH are examined. The complex ion Al (oh) 4 (-) may be the first most likely ion to be formed after the liberation of aluminum from the hydrolytically decomposed aluminosilicates in

weathering crusts (pH 7-8). With an increase in alkalinity of pore solutions to a pH of 8.5-9.5 the Al (oh) 4 (-) ion is gradually converted to Al (oh) 5 (2-) and under anomalous alkalinity conditions is changed to Al (oh) 6 (3-). There is reason to believe that gibbsite is the first aluminum hydroxide to be formed in a laterite weathering crust during intensive hydrolysis in a weak alkali medium. (Josefson-USGS)
W71-10341

2L. Estuaries

METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
Transcaucasian Scientific Hydrometeorological Research Inst., Baku (USSR). Sea Lab.
B. S. Schteinmann.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 333-338, 1970. 6 p, 5 fig, 1 tab. (Also published in IASH Publication No 91, 1970).

Descriptors: *Estuaries, *Sedimentation, *Data collections, *Instrumentation, *Tracers, Radioisotopes, Turbidity, Deltas, Tracking techniques, Sounding, Sediment load, Acoustics, Silting, Turbulent flow, Streamflow, Stream gages, Mixing, Stratified flow, Suspended load, Bed load.
Identifiers: *Acoustic sediment meters.

By measuring the natural radioactivity of drift in estuaries, the areas of river alluvium on the sea shore and shore displacement are determined. Radioacoustic recorders may be used to measure the thickness of river sediments, and to determine the volume of alluvium washed to the sea shore by the river flow. The results of studies of the bottom ridges in the anabranches and along the river channel at the seashore are presented together with an account of the relationship between velocity fluctuation and the parameters of macrostructural turbulence. The relationships between the longitudinal profile of the water surface and sediment movement on the seaward side of the river are also discussed. (Knapp-USGS)
W71-10045

WATER QUALITY MODELING OF ESTUARIES,
Water Resources Engineers, Inc., Walnut Creek, Calif.
For primary bibliographic entry see Field 05G.
W71-10047

HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
Princeton Univ., N.J. Dept. of Civil and Geological Engineering.
Roger J. M. De Wiest.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 375-385, 1970. 11 p, 3 fig, 2 tab, 7 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Saline water intrusion, *Surface-groundwater relationships, *Induced infiltration, *Hydrogeology, *North Carolina, Water quality, Drawdown, Limestones, Estuaries, Mining, Mine drainage, Mine water.
Identifiers: *Pamlico Estuary (NC).

The open pit mining of large phosphate deposits along the Pamlico River estuary in Beaufort County, North Carolina, requires pumping water from an underlying aquifer, the Castle Hayne formation, at the rate of about 65 million gallons per day. Because of seawater encroachement in estuaries, the water in the Pamlico estuary is often brackish, sometimes running from about 6,000 to 8,000 ppm of chloride. Under normal circumstances the estuary is freshened notably by the seepage of groundwater. Drawdown of the piezometric level of the aquifer at the site of the phosphate mine might reverse the hydraulic gradient and change the upward leakage into downward leakage, with a resulting contamination of the Castle Hayne aquifer by brackish water from the estuary. The extent to which such contamination would occur, whether it would be localized and limited to the site of the mine or whether it would spread and radiate from the center of pumping was determined by means of a study of the hydrologic relationships between surface water and groundwater. (Knapp-USGS)
W71-10050

A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
Memorial Univ. of Newfoundland, St John's. Dept. of Biology; and Laval Univ. Quebec. Departement de Biologie.
For primary bibliographic entry see Field 05C.
W71-10066

AN INTRODUCTION TO DETERMINATION OF ESTUARINE ASSIMILATIVE CAPACITY,
National Council of the Paper Industry for Air and Stream Improvement, Inc., New York.
For primary bibliographic entry see Field 05B.
W71-10093

03. WATER SUPPLY AUGMENTATION AND CONSERVATION

3A. Saline Water Conversion

NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
Union Carbide Corp., Tuxedo, N.Y. Sterling Forest Research Center.
For primary bibliographic entry see Field 01B.
W71-09974

SEAWATER DESALTING WITH CHEMICAL RECOVERY.
Burns and Roe, Inc., Oradell, N.J. and Dow Chemical Co., Midland, Mich.

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Price $3.25. Office of Saline Water Research and Development Progress Report No. 635, January 1971. 176 p, 66 fig, 21 ref, 2 append. OSW-AEC Agreement No. 3013.

Descriptors: *Desalination, *Multi purpose projects, *By products, Water supply, Economic feasibility, Pretreatment (Water), Water treatment, Evaluation.

This report is based on a larger study with the Puerto Rico of Energy Center of a possible nuclear power, petro-chemical, inorganic chemical complex which also uses sea water distillation for water supply. It describes studies made on 20 million gallon/day desalting plants, a size that was selected based on recovering 3,000 tons per day of salt for feed to a chlorine-caustic plant that would be part of the Energy Center. Detailed technical and economic evaluations of three methods of sea water pretreatment prior to distillation, five desalting plant designs, and salt recovery methods, including by-products NaCl, Br, KCl, Na2SO4, MgCl2 from desalting plant brine affluent, are given. (Strobel - Office of Saline Water)
W71-09975

VTE PILOT PLANT ANNUAL REPORT FOR THE PERIOD ENDING JULY 1, 1968,
Oak Ridge National Lab., Tenn. Nuclear Desalination Program.
John W. Hill, and Eugene C. Hise.

For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Price $1.25. Office of Saline Water Research and Development Progress Report No. 646, December 1970. 69 p, 17 fig, 15 tab, append. OSW Contract 14-30-2535.

Descriptors: *Pilot plants, *Heat transfer, Evaporators, Distillation.
Identifiers: *Vertical tube evaporators, Heat transfer surfaces, Extended heat transfer surfaces, Heat transfer improvements, Heat transfer coefficient, Spray nozzles, Wrightsville (NC), Beach plant.

The operation of the pilot plant at Wrightsville Beach, N.C. was in the upflow mode during the entire reporting period. The results show that the VTE can be operated successfully when equipped with enhanced surface tubes and nozzles which induce flashing at the tube inlets. The doubly fluted and the spirally grooved tubes consistently gave heat transfer coefficients about three times that of smooth tubes. There was no problems with foaming of the seawater, but more adequate brine-vapor disengagement space and entrainment separators are needed, particularly in low temperature operation. No calcium sulfate or magnesium hydroxide scale was observed during the year. The tests have provided data for the design of a larger test unit which could be housed in a compact, modular structure. (Callahan - Office of Saline Water)
W71-09976

DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
North Star Research and Development Inst., Minneapolis, Minn.
L. T. Rozelle, J. E. Cadotte, W. L. King, A. J. Senechal, and B. R. Nelson.
For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Price $1.00. Office os Saline Water Research and Development Progress Report No. 659, May 1971. 101 p, 21 fig, 19 tab, 17 ref, 4 append. OSW Contract 14-01-0001-1696.

Descriptors: *Reverse osmosis, *Membrane processes, *Desalination processes, *Membranes, Semipermeable membranes, Saline water, Separation techniques, Osmosis.
Identifiers: *Composite membranes, *Ultrathin membranes, Microporous substrates, Porous polysulfone, Tubular membranes.

Research and development on tubular composite membranes for the desalination of water by reverse osmosis are reported. The composite desalination barrier consists of an ultrathin cellulose acetate membrane, which may be as thin as 200 angstroms, supported on a microporous polysulfone film. The polysulfone support film has high chemical resistance and strength, is particularly applicable for in situ replacement of the ultrathin desalination film. It was demonstrated that these films, tested as flat sheets, could provide over 99-percent salt rejection for sea water applications and over 95-percent salt rejection at water fluxes above 20 gfd for brackish water application. The feasibility of casting and testing ultrathin membranes in tubes and and replacing them in situ was firmly established. The composites of membrane and support liners were successfully tested in commercially available 0.5-in. ID, porous, resin-reinforced fiber glass tubes. In brackish water tests (800 psi pressure and one-percent sodium chloride feed), some of these tubes with membranes approximately 1500 angstroms in thickness provided over 95-percent salt rejection at up to 20 gfd water flux. In situ removal and replacement of the membrane was repeated several times, with most membranes giving about 95-percent salt rejections and above 10 gfd flux. (Podall - Office of Saline Water)
W71-09977

SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
Peninsular Chemresearch, Inc., Gainesville, Fla.
T. W. Brooks, D. A. Warner, C. L. Daffin, and J. Patton.
For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Price $0.50. Office of Saline Water Research and Development Progress Report No. 660, May 1971. 37 p, 8 tab, 14 ref. OSW Contract 14-30-2515.

Descriptors: *Reverse osmosis, *Membranes, *Semipermeable membranes, *Desalination, Separation techniques, Membrane processes, Osmosis.
Identifiers: *Block copolymers.

The use of inorganic 'swelling salts,' and non-solvent additives such as water and H2O2 in attempts to prepare anisotropic films and therefore upgrade the performance of poly (ethylene terephthalate)-b-poly (ethylene oxide) was not successful. Under no conditions, could performance be improved beyond 80% salt rejection from 1.24% NaCl solution at A1 gfd. This particular block copolymer was dropped from consideration as a candidate reverse osmosis desalination membrane material. The block copolymer poly (bisphenol-A carbonate)-b-poly (ethylene oxide) was prepared and its evaluation as a candidate R.O. membrane was begun. The best performing composition was established as BPA 90 mole % -PEO (M665) 4 mole%, having (m)S2.0. Casting parameters such as solvents, temperature, evaporation time, swelling, annealing, and drying were studied and some of their effects upon performance characteristics determined. Membranes of excellent mechanical properties were obtained. Flux rates could be controlled by varying solvents, casting time, and evaporation temperature; the range appeared to be as wide as 0.1 to 200 gfd without materially effecting selectivity. Improvement of casting techniques to overcome fluxtuations in the thickness and effective pore size of the 'dense' layer should yield anistropic desalination membranes without outstanding performance characteristics. (Kindley - Office of Saline Water)
W71-09978

3B. Water Yield Improvement

ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
Illinois State Water Survey, Urbana.
Stanley A. Changnon, Jr.
Water Resources Bulletin, Vol 7, No 3, p 473-483, Jun 1971. 11 p, 7 fig, 19 ref.

Descriptors: *Water balance, *Great Lakes Region, *Meteorology, *Weather modification, *Evaporation, Precipitation (Atmospheric), Snowfall, Cloud seeding, Air pollution, Regional analysis, Urbanization, Cities, Hydrologic cycle, Synoptic analysis.

Existing meteorological controls of water exchange by precipitation and evaporation on the Great Lakes are almost entirely inadvertent and related to man's urban-industrial complexes and their effect upon precipitation processes. These inadvertent effects have led to 10 to 40% increases in precipitation in localized areas within the basin. Envisioned growth of urban-industrial complexes within the Great Lakes region should lead to more inadvertent weather modification in the Basin. The only existing planned weather modification efforts are those at Lake Erie which are attempting to eliminate by redistribution the concentration of lake-derived heavy snowfall along the south shore. Practical increases of lake precipitation on the order of 5-20% could be achieved on an operational basis over the Great Lakes in the next 10 years, but the time of accomplishment will depend on national priorities, international cooperation, and economic factors. These activities might produce a sizeable increase in the water quantity of the Great Lakes and should result in an improvement of water quality. Operational methods of evaporation suppression applicable to the lakes are not available. Meteorological controls to ameliorate certain undesirable lake-effect snowstorms are a near reality. (Knapp-USGS)
W71-10026

HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
Georgia Inst. of Tech., Atlanta. Dept. of Civil Engineering; and Stanford Univ., Calif.
Alan M. Lumb, and Ray K. Linsley.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY7, Paper 8232, p 1065-1080, July 1971. 16 p, 13 fig, 3 tab, 7 ref.

Descriptors: *Weather modification, *Rainfall-runoff relationships, *Water yield, *Simulation analysis, *Mathematical models, Precipitation (Atmospheric), Streamflow forecasting, Water balance, Peak discharge, Synthetic hydrology.
Identifiers: *Rainfall augmentation.

Hydrologic effects of rainfall augmentation were studied using mathematical models for the digital computer to simulate rainfall augmentation and the hydrologic response of a watershed. A statistical model was developed to simulate percent increases in hourly precipitation, then the Stanford Watershed Model was used to calculate the streamflow, soil moisture and evapotranspiration. Calculations for three study watersheds were made using measured precipitation. Precipitation increased by 10%. Generalizations were developed relating the expected increases in streamflow and evapotranspiration to the natural precipitation and streamflow. Soil moisture increases averaged from 0.1 inch for dry watersheds to 0.5 inch for watersheds in wetter climates. Increases in the mean of the annual series of peak flows ranged from 8.5% to 76% and depend on the volumes of natural precipitation, surface runoff and interflow. (Knapp-USGS)
W71-10179

THE SELETAR SCHEME, SINGAPORE,
Binnie and Partners (Malaysia).
A. J. Vail.
Water and Water Engineering, Vol 74, No 74, No 897, p 455-462, Nov, 1970. 8 p, 3 fig, 7 photo, 1 tab, 1 ref.

Descriptors: Foreign construction, Hydrologic data, Rainfall, Storage capacity, *Earth dams, Pumping plants, Pipelines, Water quality, Outlet works, Reservoirs, Soil investigations, Water consumption, *Water supply systems, Optimum moisture content, Dam foundations, Water pollution, Dam design, Siphons, Spillways, Dam construction, Foundation investigation.
Identifiers: Water availability.

Between 1967 and 1969, the reliable yield of the water sources in the Republic of Singapore was increased by 18 million gallons per day by replacing a small embankment across the Seletar Valley with 2 earth dams and building an abstraction system to pump water into the news reservoir from 8 streams flowing to the north and west coasts of the island. The Seletar scheme cost $17 million of which the foreign exchange component was financed by the International Bank for Reconstruction and Development. Water consumption in the Republic, growing by more than 5 mgd every year, lent urgency to the scheme, and rapid construction was a key factor. The dams were completed within a contract period of 21 mo despite the high in situ moisture content of the fill material and high rainfall in the region. (USBR)
W71-10382

BLAST-FRACTURING,
Western Co., Richardson, Tex.
For primary bibliographic entry see Field 08A.
W71-10418

TEMPERATURE SURVEYS: THE ART OF INTERPRETATION,
Worth Well Surveys, Inc., Midland, Tex.
H. W. Kading, and J. S. Hutchins.
Published by American Petroleum Institute, 300 Corrigan Tower Bldg., Dallas, Texas 75201. Drilling and Production Practice (1969): Acid Treating, p 1-20. 1 tab, 25 fig, 5 ref.

Descriptors: *Logging (Recording), *Wells, Acids, Cements, Aquifer characteristics, Oil industry, Water wells.
Identifiers: *Temperature logging (Wells), Cement tops, Channeling, Acid evaluation logs, Fracture evaluation logs, Water production logs.

Temperature logs are in common use in both drilling and production efforts. Because of their basically empirical - experience-based - development and semi-quantitative nature, the industry was slow to accept the use and results of this instrument. There are specific applications where temperature logs provide comparable or superior information to other investigative logging tools. In each case, however, qualitative results depend strongly on the proper commitment of equipment capability to well condition (before and during logging) and to down-hole logging methods. Six accepted temperature survey uses which are covered in detail are: cement tops, gas entry or channels, water-roduction logs, fluid-injection profile (shut-in temperature profiles, water-injection wells), fracture-evaluation logs, acid-evaluation logs. These six topics provide sound information for most normal or routine temperature applications. Each of these temperature-log applications is discussed from the standpoint of procedural prerequisites to obtain a quality log. The interpretation and use of these logs are supported with numerous examples. Throughout this paper the reliance on matching existing logs to known performance and results or down-hole conditions, as a means of determining the future use and value of a specific logging application, is stressed. (Campbell-NWWA)
W71-10427

ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
Dresser Atlas, Houston, Tex.
W. A. Zoeller, and D. M. Muir.
Published by American Petroleum Institute, 300 Corrigan Tower Bldg., Dallas, Texas 75201. Drilling and Production Practice (1969): Cements and Cementing; p 61-67. 13 fig, 3 ref.

Descriptors: *Water wells, *Logging (Recording), Oil industry, Radioactive logging, Cements.
Identifiers: *Logging of cased wells, *Cementing, Channeling, Bonding.

The development of a superior Acoustilog instrument has made it possible to obtain porosity and lithology data from cased wells. At the same time, a valuable evaluation of the cement condition can be made from the data recorded. Recent advancements in electronic technology, as well as improvements in acoustic transducers, made the design of this acoustic equipment feasible. In most situations, 40 to 50 percent cement bond is adequate for the accurate recording of formation travel times. Under certain fast velocity formation condition accurate interval transit-time logs have been obtained with even a smaller percentage of bonding. The versatility of the Acoustilog and the nuclear logging equipment makes it possible to simultaneously record the acoustic, gamma ray, neutron, caliper, and collar logs. These data are obtained routinely in both open and cased wells. The value and advantages of the acoustic-neutron through casing log are: (A) Obtaining valuable log information in wells that were cased prematurely because of bad hole conditions. (B) Obtaining valuable porosity information in wells that are to be recompleted for secondary-type production that were first completed before the advent of the acoustic log. (C) The economical advantages of both (A) and (B) are obvious. Continued success in obtaining this log could result in the development of other economical logging procedures. The interpretation

of channeling or cement absence is based on empirical conclusions derived from the recorded data. The primary purpose of this up-to-date method of evaluating cased wells is to determine porosity and formation lithology. Eventually the limitations, advantages, and disadvantages of acoustic-neutron logging in cased wells will be established. In the meantime, an important new service is available to the oil industry and also to the groundwater industry. (Campbell-NWWA)
W71-10428

3D. Conservation in Domestic and Municipal Use

WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
North Carolina Univ., Chapel Hill. Dept. of City and Regional Planning; and North Carolina Univ., Chapel Hill. Dept. of Environmental Sciences and Engineering.
For primary bibliographic entry see Field 06B.
W71-09932

3F. Conservation in Agriculture

QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
Utah Water Research Lab., Logan.
For primary bibliographic entry see Field 05B.
W71-09936

INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
Kansas Agricultural Experiment Station, Manhattan.
For primary bibliographic entry see Field 05B.
W71-09941

POLLUTION OF IRRIGATION WORKS, WATER SUPPLIES, AND WATER COURSES.
For primary bibliographic entry see Field 06E.
W71-09983

THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
Pennsylvania State Univ., College Park. Agricultural Experiment Station.
For primary bibliographic entry see Field 05D.
W71-10355

VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
Pennsylvania State Univ., University Park.
For primary bibliographic entry see Field 05D.
W71-10358

EFFECTS OF MANURE APPLICATIONS AND MITE PREDATION ON CORN ROOTWORM POPULATIONS IN MINNESOTA,
Minnesota Univ., St. Paul. Dept. of Entomology, Fisheries and Wildlife.
For primary bibliographic entry see Field 05C.
W71-10359

SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
California Univ., Riverside.
S. Davis, and S. D. Nelson.
American Society of Agricultural Engineers, National Irrigation Symposium Paper, Univ Nebr, Lincoln, Nov, 1970. 8 p, 1 fig.

Descriptors: *Subsurface irrigation, *Trickle irrigation, Percolation, Irrigation systems, Irrigation, Irrigation efficiency, Root zone, *Soil moisture movement, Polyvinyl chloride, *Capillarity, Water utilization, *Plastic pipes, Polyethylene, Research and development, Water pollution, Fertilizers, Evaporation, California, Iron oxides.
Identifiers: Experimental design.

Subsurface irrigation is the application of water under the soil surface that moves by capillarity into the root zone of the crop. Applying water at the surface in a similar manner is called trickle irrigation. Research on subsurface and trickle irrigation is being conducted by the Agricultural Research Service at Riverside, Calif. Objectives of the study are to: (1) evaluate subsurface and trickle systems, (2) evaluate subsurface water movement, (3) compare subsurface and trickle systems with conventional irrigation systems, (4) determine water use, and (5) determine whether production differences exist between conventional systems and subsurface systems. Although many research problems remain to be solved, the future of subsurface and trickle irrigation is promising. Applying water by subsurface and trickle irrigation is promising. Applying water by subsurface or trickle methods decreases waste of water and fertilizer. Reducing fertilizer losses reduces pollution in rivers and lakes. Subsurface and trickle irrigation offer a means of positively distributing irrigation water with minimum evaporation and deep percolation losses. Some commercially produced subsurface and trickle irrigation applicators are described. (USBR)
W71-10387

BASIC EQUIPMENT IN AUTOMATIC DELIVERY SYSTEMS,
Bureau of Reclamation, Sacramento, Calif.
C. P. Buyalski.
American Society of Agricultural Engineers, National Irrigation Symposium Paper, Univ Nebr, Lincoln, Nov, 1970. 18 p, 8 fig, 8 ref.

Descriptors: Automation, *Automatic control, Mechanization, Pipelines, Water conveyance, *Water control, Irrigation systems, Canals, Irrigation efficiency, Check valves, Pumping plants, Distribution systems, Sensors, *Turnout gates, Computer applications, *Irrigation engineering, Analog computers, Turnouts, *Check structures.

Emphasis is placed on showing that practical, automatic control systems for main canals, pressure pipe distribution systems, and farm turnouts are available. Typical and basic forms of control systems and equipment being applied successfully to delivery systems constructed by the Bureau of Reclamation are described. The approach taken is first to discuss a simple form of automatic control system, the 'Little Man,' and then add components to achieve greater flexibility of operation. The hydraulic filter level offset method of automatic downstream control of canal check gates shows how the application of control theory can result in achieving optimal automation with equipment of relatively simple design. Conveyance of irrigation water can be readily made automatic from the main canal headworks to the farm turnout. (USBR)
W71-10389

AUTOMATION FOR SMALL IRRIGATION PROJECTS,
Bureau of Reclamation, Bismarck, N. Dak.
T. E. Mann.
Preparer 1289, American Society of Civil Engineers, Nat Water Resources Engineering Meeting, Phoenix, Ariz, Jan, 1971.

Descriptors: *Automatic control, Automation, *Irrigation systems, Check structures, Future planning (Projected), Decision making, Weather, Transmitters, *Remote control, Telemetry systems, Communication, Canals, Cost analysis, *Operation and maintenance, Reservoirs, Headworks, Costs, VHF, Telephones.
Identifiers: Communication systems, Bureau of Reclamation, Missouri River Basin Proj.

Present trends are to use more automatic and remote controls on irrigation projects. For 3 seasons the Bureau of Reclamation has employed a remote control system using VHF radio equipment to control releases from a storage dam for a 21,800-acre irrigation project in southwest Montana. A second installation in operation for one season controls releases to the main supply canals from the diversion dam. Information on the economics for selecting such a system, and a description of the equipment installed are presented. Automation of water supply and distribution systems for an irrigation unit requires considerable study. A detailed operating plan must include such data as canal size, control structure location, weather records, and planned operating staff. Main points of control that must be determined are: reservoir headworks, principal canal headworks, key checks, and wasteways. A cost study must be made to determine whether the proposed installation will result in an operational savings in manpower and water. Finally, a competent maintenance staff is required to make the operation successful. (USBR)
W71-10391

PAHRUMP FIELD LABORATORY,
Nevada Univ., Reno. Nevada Agricultural Experiment Station.
Jack D. Wise.
Nevada Ranch and Home Review, Spring-Summer 1969, Vol 4, No 5, p 6-7. 5 fig.

Descriptors: *Experimental farms, *Farm management, *Irrigation efficiency, *Planting management, *Soil-water-plant relationships, Nevada, Reservoirs, Roads, Crop production, Varieties, Land development, Reclamation, Soil amendments, Cultivation, Weed control, Irrigation wells, Water supply, Cotton, Sorghum, Instrumentation, Furrow irrigation.
Identifiers: Pahrump Field Laboratory (Nevada), Nevada Agricultural Experiment Station, Tailing Pond.

The Pahrump Field Laboratory of the Nevada Agricultural Experiment Station was established to help solve agricultural problems in southern Nevada. Seventeen and one-half acres are for agricultural experiments, and about 8 acres include a reservoir, tailing pond, roads and farmstead. Local problems concerning irrigation, crop varieties, and new crops will be investigated. New land development, sodic soil reclamation by soil amendment, planting rates, plant species, cultivation practices and weed control will be studied in field experiments. A superintendent technician, and 2 part-time horticulturists comprise the staff. There are 2 irrigation wells, and a 3-acre-foot reservoir, which supply over 1200 gallons per minute through 3500 feet of irrigation pipe. Five photographs show cotton and sorghum trials, the laboratory reservoir, climatological instrumentation, and furrow irrigation. (Popkin-Arizona)
W71-10414

A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
Agricultural Research Service, Reno, Nev. Soil and Water Conservation Research Div; and Nevada Univ., Reno. Nevada Agricultural Experiment Station.
For primary bibliographic entry see Field 04A.
W71-10415

04. WATER QUANTITY MANAGEMENT AND CONTROL

4A. Control of Water on the Surface

LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT: THEORY AND PRELIMINARY RESEARCH DESIGN,
Oklahoma State Univ., Stillwater, Dept. of Economics.
For primary bibliographic entry see Field 06B.
W71-09937

AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
California Univ., Los Angeles. Dept. of Systems Engineering.
For primary bibliographic entry see Field 06A.
W71-09938

EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
Battelle, Memorial Inst., Columbus, Ohio. Columbus Labs.
For primary bibliographic entry see Field 06B.
W71-09940

INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
Huron River Watershed Council, Ann Arbor, Mich. Inland Lakes and Shoreland Project.
Jerome K. Fulton.
Huron River Watershed Council, Inland Lakes and Shorelands Project Report, 1971. 72 p. OWRR Project C-1874 (No. 3174) (2).

Descriptors: *Lakes, *Water management (Applied), *Reviews, *New England, *Great Lakes Region, Land management, Regulation, Legislation, Recreation, Water quality control, Zoning, Watershed management, Planning, Administration.
Identifiers: *Lake management.

The status of inland lakes and shorelands management in the Great Lakes States and New England is summarized. Resource management categories analyzed include: aquatic nuisance control, land and water use planning, public access, zoning of land and water, fish management and lake management research. The report is based on available printed information and personal interviews with selected state officials. It is one phase of a larger research project related to the management of inland lakes and shorelands. (Knapp-USGS)
W71-09945

SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
Geological Survey, Baton Rouge, La.
For primary bibliographic entry see Field 05B.
W71-09946

PROCEEDINGS OF TWENTY-FOURTH ANNUAL NEVADA WATER CONFERENCE.
For primary bibliographic entry see Field 06B.
W71-09951

FLOOD PLAIN INFORMATION, JAMES RIVER AND TRIBUTARIES, SPRINGFIELD, MISSOURI, PART 2.
Corps of Engineers, Little Rock, Ark.

Army Corps of Engineers Flood Plain Report, June 1970. 34 p, 18 fig, 26 plate, 11 tab.

Descriptors: *Floods, *Flood damage, *Missouri, Flood plains, Flood control, Non-structural alternatives, Maximum probable flood.
Identifiers: Springfield (Missouri), Standard Project Flood, Intermediate Regional Flood.

Flooding of the James River, Springfield, Missouri is described in a report of flood plain problems based on records of rainfall, runoff, and historical and present flood heights. Maps, photographs, profiles, and cross sections indicate the extent of flooding that has occurred and which may be expected to occur in the future. The information is for use in study and planning ways to minimize vulnerability to flood damages by control of flood plain use by zoning and subdivision regulations, the construction of flood protection works, or by combinations of these approaches. Peak discharges of the Intermediate Regional Flood at Kinser Bridge on James River is 66,000 cfs. Peak discharges for the Standard Project Flood at Kinser Bridge on James River is 119,000 cfs. (Woodard-USGS)
W71-09972

FLOOD PLAIN INFORMATION, SAN JACINTO RIVER (SAN JACINTO TO RAILROAD CANYON), RIVERSIDE COUNTY, CALIFORNIA.
Corps of Engineers, Los Angeles, Calif.

Army Corps of Engineers Flood Plain Report, May 1970. 31 p, 16 fig, 26 plate, 8 tab.

Descriptors: *Floods, *Flood damage, *California, Flood plains, Regional flood, Flood forecasting, Flood control, Historic flood.
Identifiers: *San Jacinto River (Calif), *Flood records, Standard Project Flood, Intermediate Regional Flood.

Flooding along the San Jacinto River from Railroad Canyon to the City of San Jacinto, an area that is locally known as the San Jacinto and Perris Valleys, is described to aid in solving local flood problems and in planning the best utilization of flood-prone lands. Maps, profiles, cross sections, and text material relating the extent of past flooding to floods which might occur in the future are based on available records of rainfall runoff, historical flood heights and other technical data. The largest flood of record in the San Jacinto River occurred on February 16, 1927, and had an estimated peak discharge of 45,000 cubic feet per second at the State Route 74 bridge near the City of San Jacinto. The damage to agricultural, highway and railway properties was estimated at $500,000 (1927 dollars). The Standard Project Flood would have a peak discharge varying between 73,500 and 95,000 cubic feet per second for the study reach. (Woodard-USGS)
W71-09973

INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
Agricultural Research Service, Tucson, Ariz. Southwest Watershed Research Center.
For primary bibliographic entry see Field 02A.
W71-10014

A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
Meteorological Office, Poona (India).
For primary bibliographic entry see Field 02B.
W71-10015

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
Agricultural Research Service, Tucson, Ariz. Southwest Watershed Research Center.
For primary bibliographic entry see Field 02A.
W71-10027

ANNUAL, SEASONAL, AND MONTHLY CHANGES IN RUNOFF IN THE UNITED STATES,
Indiana Univ., Bloomington. Dept. of Geography.
For primary bibliographic entry see Field 02E.
W71-10029

MANAGEMENT STUDY OF A TRANSITIONAL DELTA SYSTEM,
STORM Engineering Design, San Rafael, Calif.
David Russell Storm.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 443-453, 1970. 11 p, 1 fig, 1 tab. (Also published in IASH Publication No 91, 1970).

Descriptors: *Deltas, *California, *Water management (Applied), Reclamation, Agriculture, Water pollution, Saline water intrusion, Hydraulic mining, Sedimentation, Silting, Droughts, Drainage systems, Environment, Conservation.
Identifiers: Sacramento-San Joaquin Delta (Calif).

The 100 years of continuous water management and control of the Sacramento-San Joaquin Delta, as related to era and stage of development, is described. The example of this developmental process has much to contribute to effective and efficient water management technology, particularly as it applies to the physical changes made, or contemplated to accommodate the multiplicity of Delta land and water uses. Land reclamation, agriculture, ocean salinity incursion, hydraulic mining debris, droughts, marine borers, water pollution, agricultural drainage, environmental management, and full development are reviewed. (Knapp-USGS)
W71-10057

PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN: VOPROSY PROGNOZOV I RASCHETOV STOKA REK).

Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, 1970. 180 p.

Descriptors: *Hydrograph analysis, *Streamflow forecasting, *Flood routing, *Hydrologic cycle, *Rainfall-runoff relationships, Channel flow, Rain gages, Water balance, Heat balance, Meteorological data, Watersheds (Basins), River systems, Water storage, Precipitation (Atmospheric), Peak discharge, Water yield, Statistical methods, Water conveyance, Flow rates, Soils, Routing.
Identifiers: *USSR, *Transbaykal, *Siberia, *Far East, *Maritime Territory, Lake Baykal, Lake Khanka, Amur River, Ussuri River.

This collection of 16 articles is devoted to problems of hydrograph analysis, streamflow forecasting and flood routing in the Soviet Union east of Lake Baykal. The principal areas examined include the Amur and Ussuri River basins in the Transbaykal and Lake Khanka in the Maritime Territory. These papers are intended for use by hydrologists and geographers concerned with analyzing formation of runoff and engaged in computing and forecasting the flood regime of rivers. (See also W71-10181 thru W71-10189) (Josefson-USGS)
W71-10180

A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAYKAL BASED ON PRECIPITATION (RUSSIAN: PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
A. V. Bystrov.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy

Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 113-122, 1970. 10 p, 1 fig, 3 tab, 5 ref.

Descriptors: *Runoff forecasting, *Hydrographs, *Rainfall-runoff relationships, *Peak discharge, *Flood routing, River basins, Rivers, Time lag, Recession curves, Flood plains, Water levels, Discharge (Water), Precipitation (Atmospheric).
Identifiers: *USSR, *Transbaykal, Chernyy Uryum River, Travel time.

The flow of water in the Chernyy Uryum River basin is calculated from 150 average daily discharges over the period 1956-65. A graph of inflow to the basin is transformed into a hydrograph of potential runoff, which is reduced to a computed hydrograph by indirect calculation of losses. A coaxial graphic correlation is used to convert potential runoff into predicted discharge. Antecedent basin conditions and the ordinates of maximum and actual runoff hydrographs at the rising stage of the flood and maximum runoff and the ordinates of maximum and actual runoff hydrographs at the receding stage of the flood are used to construct coaxial graphs of relationships between variables. The forecasting method is based on channel lag curves covering the entire range of changes in water level. A family of unit curves of channel lag is recommended for a floodplain channel since it allows for the varying conditions of flood wave movement in a channel and of water flow onto a floodplain. (See also W71-10180) (Josefson-USGS)
W71-10181

FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN: PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
L. V. Barvinskaya, and L. I. Shilina.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 102-112, 1970. 11 p, 4 fig, 3 tab, 7 ref.

Descriptors: *Runoff, *Flood forecasting, *Hydrograph analysis, *Channel flow, *Flood routing, Precipitation (Atmospheric), Hydrographs, Water yield, Inflow, Water levels, Water storage, Channel morphology, Time lag, Floodwater, Flash floods, Discharge (Water), Antecedent precipitation.
Identifiers: *USSR, *Transbaykal, *Maritime Territory, Avvakumovka River, Nercha River, Travel time.

A method of forecasting storm flood runoff is examined for the Avvakumovka River in the Maritime Territory and for the Nercha River in Eastern Transbaykal. The forecast is based on unit-function transformations in which flood flow is adjusted for the influence of geomorphological factors. Channel flow is determined by volume and precipitation techniques. In flood forecasts based on volume techniques, total inflow, precomputed for an advance period, is adjusted for channel storage and time of travel of flood waves to define transformed hydrographs of outflow from a basin. Flood forecasts using precipitation techniques are based on determinations of water yield of the basin and runoff losses to define a hydrograph of basin inflow and outflow. A method of coaxial graphic correlation is used to convert a 100% runoff hydrograph to a computed hydrograph. Calculation of the movement of a flood wave in a floodplain channel by unit-function transformations makes it possible to obtain reliable forecasts of the rate of discharge and to define the flood wave of a flash flood. (See also W71-10180) (Josefson-USGS)
W71-10182

A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN: PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
V. M. Lylo.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 77-101, 1970. 25 p, 4 fig, 3 tab, 27 ref.

Descriptors: *Flood routing, *Streamflow forecasting, *Flood forecasting, *Water conveyance, *Hydrograph analysis, Channel flow, Water balance, Water storage, Discharge (Water), Runoff, Recession curves, Precipitation (Atmospheric), Antecedent precipitation, Water yield, Water levels, Flow, Hydrologic aspects, Time lag.
Identifiers: *USSR, *Maritime Territory, *Transbaykal, Suchan River, Unda River, Travel time.

Channel flow may be computed in two ways: by a water balance equation based on channel storage and by a typical recession curve based on precipitation. Flood routing down a channel is determined by successive approximation of values selected from unit lag curves. Multichannel flood routing is calculated by successive multiplication of the ordinates of an inflow hydrograph by each of the ordinates of a unit lag curve. In defining a flood hydrograph from precipitation, discharges are predicted on the basis of 100% runoff adjusted for the effect of many independent variables using coaxial graphs. Coaxial graphic correlation accounts indirectly for the distribution of runoff losses in time. The most effective variables--100% runoff, antecedent moisture conditions of the basin and channel storage--are used in the forecast. Two river basins--the Suchan River in the Maritime Territory and the Unda River in Eastern Transbaykal--are used to illustrate different flood routing techniques. (See also W71-10180) (Josefson-USGS)
W71-10183

CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN: RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORREKTSII),
T. G. Ponomareva.
In: Problems in Calculating and Forecasting Streamflow (Voprosy prognozov i raschetov stoka rek), Dal'nevostochnyy Ordena Trudovogo Krasnogo Znameni Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Gidrometeoizdat, Leningrad, p 69-76, 1970. 8 p, 3 fig, 4 tab, 3 ref.

Descriptors: *Discharge (Water), *Runoff, *Rivers, *Watersheds (Basins), *Rainfall-runoff relationships, Peak discharge, Distribution patterns, Precipitation (Atmospheric), Regions, Probability, Foreign research.
Identifiers: *USSR, *Far East, Amur River, Chita River, Ingoda River, Nomograms, Regionalization.

The principle of adjustment presupposes that a transfer of knowledge of the flood runoff of a gaged basin to that of an ungaged one is possible provided adjustments to differences in certain leading physico-geographic factors are introduced into the calculations for the examined basin. In the case of the Upper and Middle Amur basin, the principal factors to be considered are the regime of rain showers and the size of the basin area. The average calculation error for maximum runoff data is 11.3%; the maximum error is 56.2% and in 93% of the cases the errors do not exceed plus or minus 30%. One of the advantages of adjustment is that it is possible not only to calculate peak discharges with a sufficient accuracy but also to show the errors allowed in analyzing original data or to establish their unreliability. (See also W71-10180) (Josefson-USGS)
W71-10184

A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN: RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
For primary bibliographic entry see Field 02E.
W71-10185

CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN: K RASCHETU VODNOGO BALANSA OZ. KHANKA),
For primary bibliographic entry see Field 02H.
W71-10186

TOTAL EVAPORATION IN THE AMUR OBLAST AND MARITIME TERRITORY DURING SUMMER MONTHS (RUSSIAN: SUMMARNOYE ISPARENIYE ZA LETNIYE MESYATSY V AMURSKO-PRIMORSKOY OBLASTI),
For primary bibliographic entry see Field 02D.
W71-10187

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN: ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I YLAGI),
For primary bibliographic entry see Field 02D.
W71-10188

STORM FLOOD FORMATION PROCESSES (RUSSIAN: PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
For primary bibliographic entry see Field 02E.
W71-10189

OKLAHOMA WATER LAW, STREAM AND SURFACE, THE WATER CONSERVATION STORAGE COMMISSION AND THE 1965 AND 1967 AMENDMENTS,
For primary bibliographic entry see Field 06E.
W71-10215

REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
Pennsylvania Dept. of Forests and Waters, Harrisburg. Water Resources Branch.
Yu Shiao, and John E. McSparran.
Water Resources Bulletin, Vol 7, No 3, p 570-580, June 1971. 11 p, 4 fig, 2 tab, 9 ref.

Descriptors: *Streamflow forecasting, *Droughts, *Simulation analysis, *Synthetic hydrology, *Delaware River, Water resources development, Systems analysis, Frequency analysis, Water yield, Probability, Planning, Forecasting, Delaware River Basin Commission, Time series analysis.

The 60's drought (1961-1966) had its center over the Delaware River basin and caused water supply shortages to New York City, Philadelphia, and many other towns and industries in the basin. Until this event occurred, the existing water supply sources and those planned for the future had been considered adequate, as they were designed for the worst drought of record (usually the 1930-31 drought). By analyzing generated streamflow traces, a definite relationship was shown between the accumulated rainfall deficiency during the drought and the return periods associated with various durations of runoff in the drought. This indicated that generated traces can be used to standardize the hydrology over an area where the intensity of drought varied. Synthetic hydrology was used to determine yield-probability relationships for 50-year periods, and shortage-yield-frequency relationships for existing and planned water-supply reservoirs. It was also used to determine yield-probability relationships for reservoir systems within the basin. Although it was found that with

the streamflow generating models (first order Markov) in common use today, it is not possible to definitely determine the actual frequency of a very severe historic drought, it is possible to place a drought in perspective by using synthetic hydrology. (Knapp-USGS)
W71-10320

A STORM FLOOD HYDROGRAPH FORECAST FOR RIVERS ON THE MARITIME TERRITORY FROM RUNOFF OF REPRESENTATIVE BASINS (Metodika prognoza gidrografa dozhdevykh pavodkov rek Primor'ya na osnove ucheta stoka pokazatel'nykh basseynov),
E. A. Popova.
In: Voprosy prognozov i raschetov stoka rek, Dal'nevostochnyy Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Leningrad, p 123-128, 1970. 6 p, 1 fig, 3 tab, 6 ref.

Descriptors: *Hydrograph analysis, *Flood forecasting, *Runoff, *Model studies, *Flood routing, Rivers, Discharg (Water), Inflow, Hydrographs, Water levels, Channel flow, Time lag, Mathematical models.
Identifiers: *USSR, Maritime Territory, Ulakhe River, Channel lag, Travel time, Hydrologic forecasts.

A prediction of water discharge may be based on a calculation of the runoff of representative basins. An approximate calculation of the runoff of small rivers is made on the day of forecast. Channel lag curves, which depend upon the time of channel flow and the number of typical reaches, are used to calculate the transormation of average runoff from representative basins. A computed flood hydrograph is converted to predicted discharges by successive adjustments based on water inflow, storage capacity of the channel network, and on specific conditions at the time of forecast. The method of coaxial graphic correlation is used for the Ulakhe River basin (1,720 sq km) to determine the accuracy of computations. (See also W71-10180) (Josefson-USGS)
W71-10344

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (Prognoz ob'yema i maksimal'nogo stoka malykh rek),
V. M. Lylo, and Z. D. Mel'nikova.
In: Voprosy prognozov i raschetov stoka rek, Dal'nevostochnyy Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Leningrad, 129-140, 1970. 12 p, 3 fig, 2 tab, 10 ref.

Descriptors: *Flood forecasting, *Hydrograph analysis, *Rainfall-runoff relationships, *Runoff, *Flood routing, Rivers, Peak discharge, Discharge (Water), Precipitation (Atmospheric), Antecedent precipitation, Water yield, Time lag, Seasonal, Channel flow, Hydrographs, Water storage.
Identifiers: *USSR, *Far East, *Maritime Territory, Lake Khanka, Suputinka River, Sample basins, Antecedent moisture condition, Antecedent precipitation index, Flood peak.

The data needed to refine a storm flood hydrograph for rivers of the Lake Khanka basin and the Suputinka River are examined for developing a forecast of the volume of runoff and peak flow of small rivers of the region. Based on observations of precipitation and runoff of sample basins for the period 1956-68, a multi-variable relationship was established for precomputing storm runoff losses. The variables considered in the relationship were the antecedent moisture conditions of the basin, the flood season, and the duration of the precipitation. Optimal (upper and lower) limits of a computed time interval were established from observation data of the Primorskaya Water Balance Station. The method used to forecast peak flow makes it possible to prepare mass forecasts of runoff and flood peaks for small sparsely-studied rivers of the region for a 24-hour period. An 8-hour time interval is most acceptable for basins with areas of less than 500 sq km; for basin areas of 1,000 to 2,000 sq km a 12-hour time interval is preferred. (See also W71-10180) (Josefson-USGS)
W71-10345

CALCULATING PRECIPITATION IN WATER BALANCE ESTIMATES (Uchet osadkov pri vodnobalansovykh raschetakh).
For primary bibliographic entry see Field 02B.
W71-10346

A SHORT-TERM FORECAST OF INFLOW TO THE RESERVOIR OF THE ZEYSKAYA HYDROELECTRIC POWER PLANT (Kratkosrochnyy prognoz pritochnosti v vodokhranilishche Zeyskoy GES),
V. G. Fedorev.
In: Voprosy prognozov i raschetov stoka rek, Dal'nevostochnyy Nauchno-Issledovatel'skiy Gidrometeorologicheskiy Institut Trudy, No 31; Leningrad, p 141-148, 1970. 8 p, 2 fig, 2 tab, 5 ref.

Descriptors: *Streamflow forecasting, *Reservoirs, *Runoff, *Inflow, Statistical methods, Correlation analysis, Computers, Probability, Seasonal, Antecedent precipitation, Channel flow, Low flow.
Identifiers: *USSR, *Far East, Zeya River, Tok River, Unakha River, Tynda River, Multiple correlation.

A method of preparing a 3- and 5-day forecast of inflow to the reservoir of the Zeyskaya Hydroelectric Power Plant during the warm season is examined. Runoff of three tributaries of the Zeya River--the Tok, Unakha and Tynda--is used to describe basin moisture conditions and antecedent precipitation. The equations proposed for calculating inflow to the reservoir are obtained by multiple correlation using the Minsk-22 computer. Forecasts of inflow to the reservoir should be in the form of probabilities, since the distribution of errors does not satisfy the conditions required by the normal law of distribution. (See also W71-10180) (Josefson-USGS)
W71-10347

PRECIPITATION ADJUSTMENTS FOR RAIN-GAGE BUCKET WETTING (K voprosu o popravkakh k osadkam na smachivaniye vedra),
For primary bibliographic entry see Field 02B.
W71-10348

HEAT FLOW TO MELTING ICE ON THE USSURI RIVER (Teploprikhod k tayushchemu l'du reki Ussuri),
For primary bibliographic entry see Field 02C.
W71-10349

TWO STAGES IN THE FORMATION OF ICE-LENSES ON FROZEN RIVERS (O dvukh stadiyakh formirovaniya naledey na promerzayushchikh rekakh),
For primary bibliographic entry see Field 02C.
W71-10350

MUD FLOW OCCURRENCES IN THE RSFSR (Rasprostraneniye seley na territorii RSFSR),
Moscow State Univ. (USSR). Research Lab. for Snow Slides.
For primary bibliographic entry see Field 02J.
W71-10351

ABSENCE OF DOWNSTREAM TRANSPORT OF ALLUVIUM BY DOWNCUTTING RIVERS, AS ILLUSTRATED BY THE GAR' RIVER (Otsutstviye prodol'nogo perenosa allyuviya vrezayushcheysya reki na primere r. Gar'),
For primary bibliographic entry see Field 02J.
W71-10352

EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (Vliyaniye erozionnogo vreza rechnykh dolin na razvitiye karsta),
All-Union Designing, Surveying and Scientific Research Inst., Leningrad (USSR).
For primary bibliographic entry see Field 02J.
W71-10353

VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (Izmenchivost' vnutrigodovogo raspredeleniya stoka rek Vostochnogo Zakavkaz'ya),
Moscow State Univ. (USSR). Dept. of Arid Land Hydrology.
For primary bibliographic entry see Field 02E.
W71-10354

BASIC EQUIPMENT IN AUTOMATIC DELIVERY SYSTEMS,
Bureau of Reclamation, Sacramento, Calif.
For primary bibliographic entry see Field 03F.
W71-10389

PAHRUMP FIELD LABORATORY,
Nevada Univ., Reno. Nevada Agricultural Experiment Station.
For primary bibliographic entry see Field 03F.
W71-10414

A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
Agricultural Research Service, Reno, Nev. Soil and Water Conservation Research Div; and Nevada Univ., Reno. Nevada Agricultural Experiment Station.
Myron B. Rollins.
Supported by the U.S. Dept. of Agriculture and Nevada Agriculture and Nevada Agricultural Experiment Station. Nevada Ranch and Home Review, Spring-Summer 1969, Vol 4, No 5, p 14-15. 2 fig, 1 ref.

Descriptors: *Water loss, *Seepage, *Water conservation, *Clays, Reclamation, Canals, Reservoirs, Irrigation water, Water table, Sands, Treatment, Erosion, Montmorillonite, Playas, Economic prediction, Nevada, Arid lands, *Soil sealants, Sealants.

Canal- and reservoir - seepage control is a vital need in the arid West because seepage wastes valuable irrigation water, and contributes to high water tables. Excessive seepage usually results from the lack of proper amount or type of clay in the soil. Water borne treatment, where clay is added to water which seals sandy soils, is often short live and subject to erosion. Clay spreading requires a thick, wet clay seal to be effective. A buried membrane seal, which requires the burial of a compacted clay, is most effective and erosion free. High swelling, or montorillonite, clays are very useful. Little research has been done on the sealing properties of low-swelling clays. Hydrated mica is a common low swelling clay predominant in Nevada's dry lakes or playas. These clays are fine textured sodium clays and are good seepage sealants. If the clay is located within 30 miles of the sealing site, it costs about $0.25 per square yard to install a two-inch surface seal, which is comparable to and more biologically resistant than 8-mil polyethylene. Several reservoirs have been sealed in Nevada with playa deposits. Playa sediment seals look promising for water conservation by seepage control. (Popkin - Arizona)
W71-10415

4B. Groundwater Management

AUGER HOLE SEEPAGE THEORY,
Iowa State Univ., Ames. Dept. of Agronomy., and Iowa State Univ; Ames. Dept. of Physics.
For primary bibliographic entry see Field 02G.
W71-10011

OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
Unit of Soil Physics. Agricultural Research Council, Cambridge (England).
E. G. Youngs.
Journal of Hydrology, Vol 13, No 1, p 63-69, April 1971. 7 p, 6 fig.

Descriptors: *Withdrawal, *Water wells, *Aquifers, *Saline water intrusion, *Groundwater movement, *Saline water-freshwater interfaces, Safe yield, Dupuit-Forchheimer theory, Water table, Drawdown.
Identifiers: *Ghyben-Herzberg lenses, *Coastal aquifers.

The pumping rate of fresh water from a well in a coastal aquifer is shown to have a maximum value which may be calculated from an analysis of the horizontal seepage. In particular, this rate is greatest when the well is sunk just to sea level. As examples, the maximum pumping rates from well located in the Ghyben-Herzberg lens of fresh water formed by rainfall on a circular island and in an aquifer between a fresh water reservoir and the sea, are calculated. (Knapp-USGS)
W71-10017

REGULATIONS GOVERNING THE USE OF WATER RESOURCES AND PUBLIC SUBAQUEOUS LANDS.
Delaware Water and Air Resources Commission, Dover.
For primary bibliographic entry see Field 06E.
W71-10120

WATER WELLS AND CATHODIC PROTECTION WELLS.
For primary bibliographic entry see Field 06E.
W71-10217

GENERAL RULES AND REGULATIONS RELATING TO WELLS.
Utah Dept. of Natural Resources, Salt Lake City. Div. of Oil and Gas Conservation.
For primary bibliographic entry see Field 06E.
W71-10260

OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
High Plains Underground Water Conservation District No. 1, Lubbock, Tex.

Cross Section, Vol. 16, No 2, Feb 1970, p 1-8. 18 tab, 14 fig.

Descriptors: *Water levels, *Observation wells, *Hydrologic data, *Measurement, *Evaluation, Hydrologic properties, Analysis, Groundwater mining, Averages, Model studies, Digital computers, Water management (Applied).
Identifiers: *Ogallala Formation, *High plains underground water conservation district no. 1, Texas southern high plains, Water depletion credits.

Water levels from 760 observation wells, January to February 1970, is presented for the High Plains Underground Water Conservation District No. 1, Ogallala Formation, Texas Southern High Plains. Location maps and summary tables are given. Water levels were measured with a steel surveyor's tape. Methods of measurement evaluation and data analysis are presented. Groundwater mining is reflected by water-level declines as observed in wells. The district-wide average water-level decline was 0.94 feet per well in 1969, and 2.5 feet per well per year from 1962 to 1970. Water-level data will be useful in digital computer modeling, water management, water depletion credits, and analytical uses. (Popkin-Arizona)
W71-10413

AQUIFER MODEL RESEARCH REVIEWED.
High Plains Underground Water Conservation District No. 1, Lubbock, Tex.
For primary bibliographic entry see Field 02F.
W71-10416

AVERAGE WATER TABLE DECLINE.
High Plains Underground Water Conservation District No. 1, Lubbock, Tex.

Cross Section, Vol 16, No 3, Mar 1970, p 1-3. 2 fig, 1 tab.

Descriptors: *Water levels, *Groundwater mining, *Withdrawals, *Groundwater, *Hydrologic data, Averages, Maps, Statistical methods, Texas.
Identifiers: *Ogallala Formation, *Storage depletion, *High Plains, Underground Water Conservation District No. 1.

Average annual water-level declines in the Ogallala Formation 1962-70, are presented in a map and analyzed in statistical tables for the High Plains Underground Water Conservation District No. 1, Texas. An interpretive example is given for one county where groundwater mining or storage depletion is estimated. There are about 5,215,600 acres in the District, with declines in 14.5% or 756,351 acres, on the order of 2 to 3 feet annually. Relative amounts of pumpage are calculated and estimated. (Popkin - Arizona)
W71-10417

SHOOTING ROCK WELL INVOLVES RISKS.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.

Johnson Driller's Journal, Vol 27, No 6, p 3-6, Nov-Dec 1955. 5 fig.

Descriptors: *Water wells, Aquifer characteristics, Groundwater, Wells.
Identifiers: *Well stimulation, Nitro glycerin, TNT, Charges, Fracturing, Well rehabilitation.

Explosives are employed to shoot rock wells as a means of trying to develop greater capacity in a new well or to recover lost capacity in an old well. The practice has shown good results in a fair percentage of cases. However, because of the many unknown factors involved, there is no way to tell in advance if the shooting operation will produce beneficial results. Water wells are drilled into rock formations to obtain water in areas where suitable sand and gravel aquifers do not exist. The soil and other loose material overlying the rock aquifer is cased off by driving or setting pipe through it from the surface down to the rock. With this casing seated in the top of the rock, an open uncased hole is drilled through the consolidated formation to the desired depth. The diameter of the open hole in the rock is usually about the same as the inside diameter of the casing. The drilling bit must be small enough to pass through this casing. The depth of hole in the rock depends upon the thickness of the formation, the quantity of water desired and the water yielding ability of the formation at the particular spot where the drilling is being done. The diameter of the open hole can be enlarged in some rock formations notably sandstone, by underreaming with drilling tools specially made for this operation. The size of the hole in the rock may also be enlarged by blasting. To do this, suitable charges of explosives are lowered in the well and detonated at the desired depths. (Campbell-NWWA)
W71-10419

WELL TECHNOLOGY SERVES THE MINING INDUSTRY.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.

Johnson Drillers Journal, Vol 41, No 2, p 1-4, Mar-Apr 1969.

Descriptors: *Water wells, *Dewatering, *Waste water disposal, Injection wells, Screens, Wells.
Identifiers: *Mining industry, Kaolin mining, In-place uranium ore leaching.

While groundwater may not be the sought-for mineral, better engineering in well design, improved understanding of groundwater hydraulics, advanced drilling methods and efficient well completion methods contribute to economic means of mining the desired material. Groundwater technology, therefore, can serve the mining engineer constructively as he plays his immensely important role in economical exploitation of our country's mineral resources. This article describes four kinds of situations where groundwater technology serves the mining industry. These are: Dewatering for open pit mining, Solution mining, Wells for extracting mineralized water as a raw material, Disposal wells for difficult-to-handle waste fluids. These are applications other than drainage of mine shafts and drifts in underground workings. (Campbell-NWWA)
W71-10423

DISINFECTING WELLS AND WATER PIPING.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.
For primary bibliographic entry see Field 08A.
W71-10431

METALS THAT RESIST CORROSION SAVE MONEY.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.

Johnson Driller's Journal, Vol 34, No 2, p 1-4, March-April, 1962. 7 fig.

Descriptors: *Corrosion, *Water wells, *Drilling, Rotary drilling, Drilling equipment, Casing, Piping, Cathodic protection, Screens, Pumps.
Identifiers: Corrosion rate, Galvanic series.

Well screens and well casing together with the pumping equipment installed in water wells can suffer severe damage from corrosion. Two conditions minimize the corrosive attack. The water or soil in contact with the metal may be neutral in character. Or, the metal parts may be of a type of material which resists corrosion whether the water be neutral or aggressive. To understand the advantage of using corrosion-resistant metals and how they will save money in the long run, the fundamental conditions under which corrosion occurs is reviewed. Experience and theory, do permit the logical selection of metals that will resist corrosion, last longer and thus prove to be more economical in many situations. This is particularly true in the case of well screens for water wells. Long term experience with different metals and observations of their performance under widely differing conditions provide a sound basis for presentday applications. (Campbell-NWWA)
W71-10433

05. WATER QUALITY MANAGEMENT AND PROTECTION

5A. Identification of Pollutants

EXISTING LEVELS OF NITRATES IN WATERS - THE ILLINOIS SITUATION,
Illinois State Water Survey, Urbana. Chemistry Section.
Robert H. Harmeson, and T. E. Larson.
Proceedings 12th Sanitary Engineering Conference on Nitrate and Water Supply: Source and Control, February 11-12, 1970, University of Illinois, Urbana: Illinois University, College of Engineering Publication, p 27-39, 1970. 13 p, 5 fig, 1 tab.

Descriptors: *Nitrates, *Water pollution sources, *Illinois, *Surveys, *Monitoring, Surface waters, Groundwater, Farm wastes, Organic matter, Soil water, Path of pollutants, Public health, Sampling.

The Illinois State Water Survey has sampling programs for determining the mineral quality of ground- and surface waters in Illinois. The nitrate concentrations of streams are increasing. Since 1956, concentrations of nitrates exceeding 45 mg/liter have been found on occasion in several streams. Seasonal variation in nitrate concentrations was found in surface waters; the highest levels were found in spring and early summer. High nitrate levels are most consistently found in areas of intensive agricultural production where the soil is rich in organic nitrogen. Both soil type and extent of fertilization are important in influencing the concentration of nitrates in surface waters. Groundwater contamination by nitrogen from fertilizers is not a problem at the present time. (see also W71-09952) (Knapp-USGS)
W71-09956

THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
Miami Univ., Fla. School of Marine and Atmospheric Sciences, and Liverpool Univ. (England). Dept. of Oceanography.
D. A. Segar, J. D. Collins, and J. P. Riley.
Journal of the Marine Biological Association of the United Kingdom, Vol 51, p 131-136, 1971. 4 tab, 4 ref.

Descriptors: *Trace elements, *Absorption, *Mollusks, *Environmental effects, *Physiological ecology, Sodium, Potassium, Calcium, Magnesium, Strontium, Phosphorous, Clams, Gastropods, Mussels, Snails, Shellfish, Bioassay, Animal physiology, Public health, Manganese, Cobalt, Copper, Chromium, Aluminum, Pollutant identification.
Identifiers: Bioaccumulation, Accumulation, Concentration, Iron, Nickel, Cadmium, Lead, Zinc, Silver.

A study was made of the distribution of 6 major and 13 trace elements in the shells and entire soft parts of 11 species of mollusk from the Irish Sea and in those of one freshwater species. Values are also presented for the occurrence of these elements in the various organs of Pecten maximus and Modiolus modiolus. All the trace metals are considerably more enriched in the soft parts of the organisms than in the marine environment. The highest concentrations of most of these elements are found in the digestive organs and gills, and the lowest concentrations are found in the shells. (LeGore - Washington)
W71-09982

DDT RESIDUES IN MARINE PHYTOPLANKTON: INCREASE FROM 1955 TO 1969,
Hopkins Marine Station, Pacific Grove, Calif.
James L. Cox.
Science, Vol 170, p 71-73, 2 October, 1970. 2 fig, 18 ref. NSF Grant GB 8408; Calif. State Marine Research Committee Grant.

Descriptors: *DDT, *Chlorinated hydrocarbon pesticides, *Pesticide residues, Water pollution effects, *Pesticide kinetics, *Phytoplankton, California, Balance of nature, Food chains, Path of pollutants, Bioassay, Bio-indicators, Public health, Water pollution sources, Chromatography, Absorption, Standing crop, Pollutant identification.
Identifiers: DDE, DDD, Monterey Bay California, Gas-liquid chromatography, Bioconcentration.

Phytoplankton samples collected in Monterey Bay, California, from 1955 to 1969 contained compounds identified as p,p'-DDT, p,p'-DDD, and p,p'-DDE. Total concentrations of these compounds were approximately three times greater in the later samples. Lower concentrations throughout the period were associated with higher densities of standing crop. (LeGore - Washington)
W71-09984

MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
Fisheries Research Board of Canada, St. Andrews (New Brunswick). Biological Station.
For primary bibliographic entry see Field 05C.
W71-09989

FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
Farbenfabriken Bayer A.G., Elberfeld (West Germany).
R. Strufe, B. C. Dazo, and I. K. Dawood.
Pflanzenschutz-Nachrichten 'Bayer' (English edition), Vol. 18, p 110-122, 1965. 6 fig, 4 tab, 6 ref.

Descriptors: *Public health, *Application methods, *CHemcontrol, *Dispersion, *Diseases, *Molluscacides, *Snails, Dusts, Pest control, Rates of application, Sprays, Parasitism, Gastropods, Bioassay, Lethal limit, Pesticides, Water pollution effects, Pollutant identification.
Identifiers: *Bilharziasis, *Schistosomiasis, *Disease control, *Snail control, Bayluscide, Biomphalaria sp., Bulinus sp.

This study compared the wettable powder form and the liquid formulation of Bayluscide as molluscicides against snails, Bulinus truncatus and Biomphalaria alexandrina. Serial dilutions of each were tested. Both formulations were found equally effective, i.e. a 24 hr exposure to 0.2-0.3 ppm of either form killed the snails. An attempted field trial in a canal proved successful. The efficacy of using corn cobs to facilitate a floating formulation is discussed. The method is apparently successful, inexpensive, and permits efficient introduction of the molluscicide into the water. (See also W71-09995 thru W71-09997). (LeGore-Washington)
W71-09994

IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
Farbenfabriken Bayer A.G., Elberfeld (West Germany). Inst. of Parasitology and Veterinary Medicine.
R. Strufe.
Pflanzenschutz-Nachrichten 'Bayer' (English edition), Vol. 18, p 123-129, 1965.

Descriptors: *Bioassay, *Molluscicides, *Analytical techniques, Pollutant identification, *Colorimetry, *Chemical analysis, *Water analysis, *Laboratory tests, Assay, Pollutants, Water pollution effects, Toxins, Pesticides, Chemcontrol, Color, Instrumentation, Test procedures, Spectrophotometry.
Identifiers: Bayluscide, Quantitative analysis.

A discussion is presented of basic procedures in analysis of molluscicides, primarily Bayluscide, which is used in bilharziasis, or schistosomiasis, control. Equipment required and problems encountered in colorimetric analysis are considered, and a bioassay method using snails is briefly presented. It is proposed that such methods may be used: (1) in determination of active ingredient content in the water for checking the calculated application dose; (2) in investigations of the active ingredients' distribution in watercourses; and (3) in investigations of the stability of the active ingredient under the influence of environmental factors. (See also W71-09994). (LeGore-Washington)
W71-09995

LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
Farbenfabriken Bayer A.G., Elberfeld (West Germany). Inst. of Parasitology and Veterinary Medicine.
R. Strufe.
Pflanzenschutz-Nachrichten 'Bayer' (English edition), Vol. 18, p 130-139, 1965. 6 fig, 1 tab, 4 ref.

Descriptors: *Molluscacides, *Analytical techniques, *Pollutant identification, *Colorimetry, *Spectrophotometry, *CHemical analysis, *Water analysis, Assay, Pollutants, Water pollution, Toxins, Pesticides, Laboratory tests, Chemcontrol, Color.
Identifiers: *Bayluscide, Quantitative analysis.

In molluscan control operations it has proven expedient to develop methods of quantitative determination of molluscicide content of water. Two laboratory methods for determination of 0.2-2.0 ppm of the active ingredient of Bayluscide are described. Both techniques are colorimetric, spectrophotometric procedures involving reduction of the active ingredient. (See also W71-09994). (LeGore-Washington)
W71-09996

DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
Farbenfabriken Bayer A.G., Elberfeld (West Germany). Chemotherapeutic Inst.
R. Strufe.
Pflanzenschutz-Nachrichten 'Bayer' (English edition), Vol 15, p 42-49, 1962. 3 fig, 1 tab, 9 ref.

Descriptors: *Molluscacides, *Analytical techniques, Pollutant identification, *Colorimetry, *Chemical analysis, *Water analysis, *On-site tests, Assay, Pollutants, Water pollution effects, Toxins, Pesticides, Chemcontrol, Color, On-site investigations, On-site data collections, Instrumentation, Sampling, Test procedures.
Identifiers: *Bayluscide, Quantitative analysis.

Two colorimetric methods are described for determining the active ingredient of Bayluscide in field tests at concentrations of 0.4-2.0 ppm. The first method is based on the principle that Bayluscide is concentrated by extracting it from the aqueous solution; then, by adding alkali hydroxide, it is converted into a yellow dyestuff with an absorption maximum of 385 mu. In the second method, the active ingredient is determined by yielding a color complex with safranin TH and extracting the complex with a mixture of organic solvents. A simple method, suitable for field work, for measuring the intensity of color by using a color wedge colorimeter is described. (See also W71-09994) (LeGore-Washington)
W71-09997

DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
Department of Energy, Mines and Resources, Burlington (Ontario). Inland Waters Branch.
For primary bibliographic entry see Field 07B.
W71-10072

PHYTOPLANKTON COEFFICIENTS AS A METHOD OF DEFINING THE DEGREE TO WHICH WATER HABITATS ARE TROPHIC (In Polish),
Instytut Rybactwa Srodigdowego, Olsztyn-Kortowo (Poland). Zaklad Hydrobiologii.
For primary bibliographic entry see Field 05C.
W71-10075

ATOMIC ABSORPTION DETERMINATION OF MICROGRAM QUANTITIES OF MOLYBDENUM IN LAKE WATERS,
Department of Energy, Mines and Resources, Burlington (Ontario). Canada Centre for Inland Waters.
For primary bibliographic entry see Field 07B.
W71-10077

A SIMPLE, SENSITIVE UNDERWATER PHOTOMETER,
Michigan State Univ., Hickory Corners. W.K. Kellogg Biological Station.
For primary bibliographic entry see Field 07B.
W71-10089

DIGESTION OF OYSTERS FOR THE DETERMINATION OF MERCURY,
Gulf Coast Water Hygiene Lab., Dauphin Island, Ala.
Jack Mayer.
Bulletin of Environmental Contamination and Toxicology, Vol 5, No 5, p383-388, 1970. 2 fig, 2 tab, 9 ref.

Descriptors: *Analytical techniques, *Digestion, *Oysters, Laboratory tests, Spectrophotometry, Chelation.
Identifiers: *Mercury, *Low mercury concentrations, Mobile Bay (Ala), Dithizone chelation, Potassium permanganate, Tissues, Lyophilized mercery, Dried mercury.

A method for detection and estimation of mercury concentrations less than 1 ppm was needed for a survey of any existing concentrations of mercury in oysters harvested from Mobile Bay and waters of southern states. Dithizone chelation with final quantitation by a Beckman DU Spectrophotometer at a wavelength of 490 nm was selected. Prevention of mercury loss in preparation of the sample due to its volatile nature was the problem. Heat generated from mixing of concentrated sulfuric acid and water was used for digestion of the oyster tissue and addition of small increments of solid potassium permanganate. To establish the method, oysters were spiked with known quantities of mercury, the mercury recovered, and checked against optical density. Details of the digestion process are given. This digestion technique was also applied to lyophilized and dried mercury fortified oyster tissue at 100C. The drying methods did not cause loss of mercury. The digestion technique may be used on other substances easily digested by concentrated sulfuric acid and potassium permanganate. These analyses experiments demonstrate the applicability to freshly harvested oysters exposed to mercury concentrations. (Jones-Wisconsin)
W71-10092

CAGE AND KENNEL WASTE WATER,
National Institutes of Health, Bethesda, Md. Div of Research Services.
N. A. Jaworski, and J. L. S. Hickey.
This was reported as 'NIH Detergent for Mechanical Washing of Laboratory Glassware and Animal Cages' Sanitary Engineering Branch Project 136 (1955). Journal Water Pollution Control Federation, Vol 34, No 1, p. 40-43, Jan, 1962. 1 fig, 5 tab, 2 ref.

Descriptors: *Waste water disposal, *Biochemical oxygen demand, Waste water, Water analysis, Animal wastes (Wildlife), Waste identification, Waste dilution, Waste water treatment, Laboratory animals.
Identifiers: *Waste water production, Total solids, Volatile solids, Composite samples, Cage cleaning wastes, Kennel.

The National Institutes of Health is planning a laboratory-animal colony in an unsewered area. The waste water from the colony will require treatment on the site. The waste water from cage cleaning and kennel cleaning is expected to represent a large percentage of the total sewage of the colony. A study of the volume and character of the waste water of a similar animal colony to the one porposed was made. Mechanical washers are used to clean the cages. Each washer contains a 1,000-gallon recirculating wash water tank and a 500-gallon, recirculating, rinse water tank. Excess water overflows to the sewers. Samples of the overflow were collected at 30-minute intervals. These samples were composited in proportion to the quantity of waste water from each machine. The BOD IN THE OVERFLOW WAS LESS THAN THAT IN THE WASTE WATER DRAINED FROM THE TANKS. The PH was 11.0 and the temperature was 140 to 160F of the waste water. The BOD, total solids, and volatile solids of the waste water from hosing of the pens was approximately three times per unit volume as that found in domestic sewage. The waste water has a sharp, unpleasnat odor, which might constitute a problem when it is treated in a population area. (Hazen-Iowa State)
W71-10100

AIR POLLUTION FROM ANIMAL WASTES,
Cornell Univ., Ithaca, N.Y. Dept. of Food Science.
William E. Burnett.
Environmental Science and Technology, Vol 3, No 8, p 744-749, Aug 1969. 6 fig, 2 tab, 21 ref. N.Y. State Dept. of Health C-1101 USDA, ARS 12-14-100-9092 (44).

Descriptors: *Farm wastes, *Pollutant identification, *Odor, Air pollution, Gas chromatography, Organic compounds, Organic acids, Aromatic compounds, Poultry, Laboratory tests.
Identifiers: *Malodor, *Odorous compounds, *Odor identification, Liquid poultry manure.

A combination of gas chromatographic and organoleptic techniques was used to determine the chemical compounds responsible for the offensive odor of accumulated liquid poultry manure. The volatile odorous substances were trapped and concentrated in short sections of gas chromatographic columns held at -78C., separated by gas chromatography and identified by the correspondence between relative retention time and the odors of the peaks for the unknowns and authentic compounds. Mercaptans, sulfides, and diketones were identified. Volatile organic acids and the nitrogen heterocycles, indole and skatole, were also identified, using direct injections of liquid manure supernatant and standard gas chromatographic techniques. The sulfur compounds, organic acids, and skatole were implicated as important malodorous components involved in air pollution. The prevention of the formation of the malodorous substances was suggested as the best means of control of air pollution from animal wastes. (Hazen-Iowa State)
W71-10101

THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
Georgia, Univ., Athens. Dept. of Agronomy.
K. H. Tan, R. A. Leonard, A. R. Bertrand, and S. R. Wilkinson.
Georgia Agr. Exp. Sta. Journal Series Paper No. 760. Soil Science Society of American Proceedings, Vol 35, No 2, p 265-269, Mar 1971. 3 fig, 1 tab, 23 ref.

Descriptors: *Farm wastes, *Organic matter, *Organic wastes, *Infrared radiation, Chelation, Analytical techniques, Chemical reactions, Laboratory tests.
Identifiers: *Poultry litter, *Infrared identification, Infrared analysis, Organic waste products, Complexing agents, Chelating ligands.

The metal complexing capacity and the nature of the chelating legands of organic matter extracted from broiled house litter were studied by ion-exchange equilbrium and dissolution methods and infrared to exhibit a significant chelating effect on the equations Cu2.., 2n2.., Mg2.., and Al3... The amount of organic matter complexed by one mole of metal and the stability of metal complexes increased with increasing pH in the cases of Cu-, Mg-, and Al- complexes. Infrared analysis revealed spectograms of the ligands similar to those obtained by polysaccharides. Functional group frequency vibration comparisons ar 3,500, 3,200, 1,650, and 1,400 cm-1 showed that the formation of stable metal complexes involved carboxyc electrovalent linkages and probably hydroxyl and/or amino coordinate linkages. (Hazen-Iowa State)
W71-10102

THE DECOMPOSITION OF URIC ACID IN BUILT UP POULTRY LITTER,
Edinburgh Univ. (Scotland). School of Agriculture; and Edinburgh Univ. (Scotland). Dept. of Bacteriology.
For primary bibliographic entry see Field 05B.
W71-10107

PROPERTIES OF FARM ANIMAL EXCRETA,
E. P. Taiganides, and T. E. Hazen.
ASAE Paper No. 64-315. Transactions of the american society of agricultural engineers, Vol. 9, p 374-376, 1966. 6 tab, 13 ref. Iowa Agricultural and Home Economics Experiment Station Project 1433.

Descriptors: *Farm wastes, *Physical properties, *Chemical properties, Biochemical oxygen demand, Chemical oxygen demand, Livestock, Disposal, Gases, Odor, Biodegradation, Fertilizers, Value, Nutrients, Pollutant identification.
Identifiers: Population equivalents, Handling.

Data on the most important of the physical, chemical, and biological properties of poultry swine and cattle excreta have been reported, analyzed and discussed as to their value in the design of manure treatment facilities. The distinction is made between sewage and manure. Feed influences the quantity of waste and its chemical composition. Little work has been done recently to determine the physical properties of animals wastes. The daily production of manure from farm animals varies considerably. The questions is raised if it pays to collect and use animals manures as fertilizer. The availability of manure handling devices and disposal problem of wastes indicates justification of application to soils. Poultry manure has highest fertilizer value, swine is next. The biochemical oxygen (BOD) test is used to determine pollutional strength of an organic waste in terms of the oxygen demand that the waste will exert on a water body if discharged into anatural watercourse in which aerobic conditions must be maintained. The chemical oxygen demand (COD) test is also used as an index of strength of waste. A comparison is made of BOD and COD production mean values for man, hens, swine, and cattle. There is a lack of information on the composition of the gases, and on the control of odors produced as a result of the uncontrolled biological degradation of manures. (Hazen-Iowa State)
W71-10109

POULTRY DUST: ORIGIN AND COMPOSITION,
Auburn Univ., Ala. Agricultural Experiment Station.
J. Koon, J. R. Howes, W. Grub. and C. A. Rollo.
Agricultural Engineering, Vol 44, No 11, November, 1963 p. 608-609. 4 fig.

Descriptors: *Dusts, *Farm wastes, Poultry, Environmental effects.
Identifiers: Environmental control, Dust composition.

Dust is a major problem in poultry environmental control as it impairs the operational efficiency of equipment to a degree that its use becomes impractical. A study was made to determine the composition of poultry dust and to establish the effects of temperature on the dust produced. Single comb H3W white Leghorn laying hens were exposed to constant temperatures of 50, 60, 70, 80, 90, 100F. Broiler tests were conducted using vantress male cross No. 50 arbor acres female Whiterock chicks. Qualitative and quantitative dust samples were obtained and tested. The dust from laying hens contained approximately 92% dry matter, of which 60% was crude protein. Fat analysis was 9%, cellulose 4%. The remainder of the dry matter was ash and hydrocarbons. The broiler dust was lower in fat and higher in protein. Birds raised on litter have a decline in dust production at 90F. Relative humidity for all environmental chambers was 60%. (Hazen-Iowa State)
W71-10110

MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
Washington Univ., Seattle. Lab. of Radiation Ecology.
For primary bibliographic entry see Field 05C.
W71-10206

COPPER/BICARBONATE EQUILIBRIA IN SOLUTIONS OF BICARBONATE ION AT CONCENTRATIONS SIMILAR TO THOSE FOUND IN NATURAL WATER,
Water Pollution Research Lab., Stevenage (England).
M. J. Stiff.
Water Research, Vol 5, No 5, p 171-176, May 1971. 6 p, 1 fig, 2 tab, 5 ref.

Descriptors: *Trace elements, *Copper, *Carbonates, *Water chemistry, *Poisons, Fish, Water quality, Bicarbonates, Hydrogen ion concentration.
Identifiers: Complexes (Chemical).

The equilibrium constant for the reaction between cupric and bicarbonate ions which results in the formation of the soluble complex species, CuCO3, was determined by means of a cupric ion selective electrode. The possibility of the formation of complex species other than CuCO3, was examined. The implications of the presence of the CuCO3 species to the toxicity of copper to fish in natural waters are discussed. The concentration of free cupric ion represents only a fraction of the total soluble copper present in a bicarbonate solution of the concentration and pH range of most natural waters. In a bore-hole water, complexing occurred in just the same way as in sodium bicarbonate solutions. If cupric ion were the toxic form of copper and the copper carbonate complex were relatively nontoxic then this would account for the difference in toxicity of copper to fish between hard and soft water. The difference in toxicity would then be related not to the difference in hardness alone but to the difference in alkalinity which it accompanies. (Knapp-USGS)
W71-10323

ORGANIC CARBON AND NITROGEN IN THE SURFACE SEDIMENTS OF LAKES ONTARIO, ERIE, AND HURON,
Department of Energy, Mines and Resources, Burlington (Ontario). Canada Center for Inland Waters.
A. L. W. Kemp.
Journal of Sedimentary Petrology, Vol 41, No 2, p 537-548, June 1971. 12 p, 5 fig, 4 tab, 49 ref.

Descriptors: *Organic matter, *Bottom sediments, *Great Lakes, Water pollution sources, Biodegradation, Lake Ontario, Lake Erie, Lake Huron, Mud, Nitrogen, Sediment-water interfaces, Mud-water interfaces, Path of pollutants, Water chemistry, Benthos, Surveys, Pollutant identification.

Analyses of 355 surface sediment samples (top cm) from Lakes Ontario, Eric and Huron were carried out for organic carbon, carbonate carbon, Eh, pH, nitrogen and sediment texture. Similar analyses were carried out on a representative core from each lake at close intervals down to 20 cm. The distribution of organic matter in the sediments of each lake was related to the topographic features of the lakes. Organic carbon content was found to be directly proportional to the clay content of the sediment, ranging from less than 1% in the coarse near shore sands to over 4% in the fine clay muds within the individual lake sub-basins. The organic carbon content of Lake Erie sediments was generally lower than that of Lakes Huron and Ontario, and is attributed to dilution of the sediments with coarser non-clay particles. Nitrogen was directly proportional to organic carbon with carbon-nitrogen ratios ranging from 7 to 13 in the surface sediment. Organic carbon and nitrogen decreased sharply from the surface down to about 10 cm in each core. The decrease is due partly to mineralization of organic matter by bottom organisms and partly to an increasing input of organic matter to the lakes in the last 30 years. (Knapp-USGS)
W71-10327

IDENTIFICATION OF METABOLITES OF N - (1, 1-DIMETHYLPROPYNYL) - 3,5 DICHLORBENZAMINE IN RAT AND COW URINE AND RAT FECES,
Rohm and Haas Co., Springhouse, Pa., Research Labs.
Roy Y. Yih, and Colin Swithenbank.
Journal of Agricultural Food Chemistry, Vol. 19, No. 2, 1971 p 320-324, 3 fig., 3 tab., 7 ref.

Descriptors: *Farm wastes, Laboratory tests, Chemical analysis, Metabolism, Radioactivity techniques, *Pollutant identification.
Identifiers: *Metabolic pathways, Chemical structure, Metabolites.

This is the continuation of studies to determine the comparative metabolism of N- (1,1-dimethylpropynyl)-3,5-dichlorobenzamide in soil, plants, and animals. Nine metabolites were identified in soil and alfalfa treated with this compound. This study concerns the isolation, identification and synthesis of these metabolites in rat and cow urine and rat feces. Tentative metabolic pathways and its comparative metabolism in soils, plants, and mammals are postulated. (Christenbury-Iowa State)
W71-10356

CATTLE FEEDLOT WATER QUALITY HYDROLOGY,
Colorado State Univ., Fort Collins. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 05G.
W71-10373

5B. Sources of Pollution

QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
Utah Water Research Lab., Logan.
Jimmie L. Thomas, J. Paul, and Eugene K. Israelsen.
Available from the National Technical Information Service as PB-201 004, $3.00 in paper copy, $0.95 microfiche. Report PRWG 77-1, June, 1971, 94 p, 28 fig, 6 tab, 92 ref, 4 append. OWRR Project B-038-UTAH (1).

Descriptors: Water pollution sources, *Ion exchange, *Water quality, *Irrigation efficiency, Simulation, Groundwater, Planning, Management, Percolation, *Model studies, *Computer programs.
Identifiers: *Irrigation return flow, Hydrologic-quality model.

A hybrid computer program is developed to predict the water and salt outflow from a river basin in which irrigation is the major water user. A chemical model which predicts the quality of water percolated through a soil profile is combined with a general hydrologic model to form the system simulation model. The chemical model considers the reactions that occur in the soil, including the exchange of calcuim, magnesium, and sodium cations on the soil complex, and the dissolution and precipitation of gypsum and lime. The chemical composition of the outflow is a function of these chemical processes within the soil, plus the blending of undiverted inflows, evaporation, transpiration, and the mixing of subsurface return flows with groundwater. The six common ions of western waters, namely calcium (Ca (....)), magnesium (Mg (....)), sodium (Na (..)), sulfate (SO4 (&)), chloride (Cl (-)), and bicarbonate (HCO3 (-)) are considered in the study. Total dissolved solids (TDS) outflow is obtained by adding the individual ions. The overall model operates on monthly time increments. The model is tested on a portion of the Little Bear River Basin in northern Utah. The model successfully simulates measured outflows of water and each of the six ions for 24-month period. Only sodium ions, which occurred in small concentrations comprising approximately 2 percent of the total salt outflow, exhibit significant discrepancies between predicted and observed values. All other ions agree within 10 percent on a weight basis for the two-year model period, with correlation coefficients ranging from .87 to .97. The usefulness of the model is demonstrated by a management study of the prototype system. For example, preliminary results indicated that the available water supply could be used to irrigate additional land without unduly increasing the salt outflow from the basin. With minor adjustments the model can be applied to other areas.
W71-09936

INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
Kansas Agricultural Experiment Station, Manhattan.
Herbert Knutson, A. M. Kadoum, T. L. Hopkins, Glen F. Swoyer, and T. L. Harvey.
Pesticides Monitoring Journal, Vol 5, No 1, p 17-27, June 1971. 11 p, 1 fig, 9 tab, 24 ref. OWRR Project B-007-KAN (2).

Descriptors: *Pesticide residues, *Pesticide kinetics, *Persistence, *Kansas, *Irrigation, Path of pollutants, Translocation, Biodegradation, Soil contamination, Aldrin, Diazinon, Dieldrin, Organophosphorus pesticides, Carbamate pesticides.
Identifiers: *Great Plains Irrigation District.

Surveys of insecticide use from 1960-69 indicated generally light application of insecticides throughout the Great Plains Irrigation District before irrigation started in 1963; after irrigation, use of organophosphates and carbamates increased greatly. Soil and foliar applications of insecticides were tested annually from 1965-69 at approximate maximum recommended rates to a 20-acre, irrigated cornfield receiving 30 to 42 inches of moisture per year. Soil applications of diazinon and parathion at planting time in May resulted in no detectable soil or foliage residues in samples taken after 1.5 to 2.5 months. Similar applications of heptachlor resulted in total heptachlor-heptachlor epoxide residues of 0.16 to 1.30 ppm at harvest without successive yearly accumulation; about 95% of the combined residue disappeared in a year. No residues were detected in the grain following either soil or foilage applications. Capped wells, from 13 to 71 feet deep, contained no residues at the 0.1 ppb level, indicating no vertical penetration from surface applications (penetration did not exceed 12 inches) and no lateral contamination of groundwater from adjacent land. Surface water samples from the Smoky Hill River and the Cedar Bluff Reservoir contained no residues at the 0.1 ppb level. Aldrin, dieldrin, endrin, heptachlor epoxide, and DDE were infrequently detected in the surface waters at trace levels. (Knapp-USGS)
W71-09941

DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
New Hampshire Univ., Durham. Inst. of Natural and Environmental Resources.
Francis R. Hall.
Water Resources Research, Vol 7, No 3, p 591-601, June 1971. 11 p, 5 fig, 4 tab, 11 ref. OWRR Project A-002-NH (4).

Descriptors: *Mixing, *Dissolved solids, *Discharge (Water), *Path of pollutants, Aqueous solutions, Dispersion, Diffusion, Mathematical models, Data processing, Streamflow, Turbulent flow, Open channel flow, Waste dilution.
Identifiers: *Dissolved solids-discharge relations.

Six mixing models and a number of equations derived from them have been proposed for some possible dissolved solids-discharge relationships in streams. The equations can be put in a form suitable for statistical analysis by digital computer. In actual application, however, a major problem arises in determining which equation or model is most applicable because the data tend to fit two or more equations equally well. A particular difficulty is encountered in deciding whether a constant component of dissolved solids is present. This decision is most critical when only total dissolved solids or

electrical conductivity is used for concentration. An examination of other chemical data, if available, along with knowledge of the stream help decide which model is most suitable. Other problems may arise from factors such as nonrandom trends and variations in the storage volume-discharge relationship. Under these circumstances, an extension of the equations beyond the range of actual data or inferences about physical or chemical significance of the equations or constant terms should be made with caution. (Knapp-USGS)
W71-09942

SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
Geological Survey, Baton Rouge, La.
William J. Shampine.
Geological Survey - Sabine River Compact Administration Cooperative Report, 1971. 34 p, 18 fig, 1 plate, 1 tab, 6 ref.

Descriptors: *Streamflow, *Reservoirs, *Hydrologic data, *Louisiana, *Texas, Streamflow forecasting, Regulated flow, Flow rates, Natural flow, Powerplants, Discharge measurement, Water quality, Data collections, Hydrographs, Floods, Flood control, Water temperature, Chemical analysis, Water pollution sources.

Creation of Toledo Bend Reservoir (Texas-Louisiana) has caused significant changes in the characteristics of Sabine River floods originating in the immediate vicinity of the reservoir. A flood with a 20-year recurrence interval will necessitate a constant release of 50,000 cfs for 4 days to maintain a lake level elevation less than 173.5 feet when the initial elevation is 170 feet. Oxygen depletion in the hypolimnion during the summer causes several water-quality problems in Toledo Bend Reservoir. The hydrogen sulfide concentration in this zone gets as high as 1.8 mg/liter, the iron and manganese concentrations range from 1 to 2 mg/liter, the chemical oxygen demand averages about 20 mg/liter, and the biochemical oxygen demand averages about 4 mg/liter. The traveltime and maximum concentration of any soluble contaminant spilled into Bayou Anacoco from Rosepine, La. to the mouth can be calculated. If 1,000 pounds of a contaminant were dumped into Bayou Anacoco at mile 20 when the discharge at the point was 150 cfs, the maximum concentration that would reach the mouth would be 5.0 mg/liter, and it would occur 41 hours after the dump. (Woodard-USGS)
W71-09946

NITRATE AND WATER SUPPLY: SOURCE AND CONTROL.
Illinois Univ., Urbana. Dept. of Sanitary Engineering.

Available from Engineering Publications Office, 112 Engineering Hall, University of Illinois, Urbana 61801-Price $4.50. Verne Snoeyink, and Virginia Griffin, editors. Proceedings 12th Sanitary Engineering Conference, February 11-12, 1970, University of Illinois, Urbana: Illinois University, College of Engineering Publication, 1970. 195 p.

Descriptors: *Nitrates, *Water supply, *Water pollution sources, *Water pollution effects, *Path of pollutants, Water treatment, Waste water treatment, Sewage treatment, Groundwater, Surface waters.
Identifiers: Nitrate sources.

General background information and concepts on the subject of nitrates in water supplies are presented. While three states have set total nitrogen or nitrate standards, fifteen states have limited the concentration of ammonia which endangers aquatic life at levels of 0.5 mg/1. The traditional concepts and process design objectives of sewage treatment have been the production of nitrates. Biological treatment systems were designed for the removal of suspended solids and Biochemical Oxygen Demand but not for nitrogen removal. Septic tanks also contribute to the concentration of nitrates in groundwater. Urbanization is not the only contributing factor to the increasing concentration of nutrients in the water. Harvesting of trees, ploughing up of root zones, paving of surfaces, and many other activities hasten the movement of nitrates from the land to the water. Therefore, the old objectives of BOD and suspended solids removal are not adequate. It is important to deal with nitrates in the whole system of nature and to identify where man can apply engineered subsystems to keep high concentrations of nitrogen out of the water supply. (See also W71-09953 thru W71-09961) (Knapp-USGS)
W71-09952

NITRATES IN WATER SUPPLIES - THE PROBLEM,
California Univ., Berkeley. Dept of Sanitary Engineering.
P. H. McGauhey.
Proceedings 12th Sanitary Engineering Conference on Nitrate and Water Supply: Source and Control, February 11-12, 1970, University of Illinois, Urbana; Illinois University, College of Engineering Publication, p 1-5, 1970. 5 p, 3 ref.

Descriptors: *Nitrates, *Water supply, *Water pollution sources, *Water pollution effects, *Path of pollutants, Water treatment, Waste water treatment, Sewage treatment, Groundwater, Surface waters.
Identifiers: Nitrate sources.

General background information and concepts on the subject of nitrates in water supplies are presented. While three states have set total nitrogen or nitrate standards, fifteen states have limited the concentration of ammonia which endangers aquatic life at levels of 0.5 mg/1. The traditional concepts and process design objectives of sewage treatment have been the production of nitrates. Biological treatment systems were designed for the removal of suspended solids. and Biochemical Oxygen Demand but not for nitrogen removal. Septic tanks also contribute to the concentration of nitrates in groundwater. Urbanization is not the only contributing factor to the increasing concentration of nutrients in the water. Harvesting of trees, ploughing up of root zones, paving of surfaces, and many other activities hasten the movement of nitrates from the land to the water. Therefore, the old objectives of BOD and suspended solids removal are not adequate. It is important to deal with nitrates in the whole system of nature and to identify where man can apply engineered subsystems to keep high concentrations of nitrogen out of the water supply. (See also W71-09952) (Knapp-USGS)
W71-09953

THE NITROGEN CYCLE.
Metcalf and Eddy, Inc., Boston, Mass.
Clair N. Sawyer.
Proceedings 12th Sanitary Engineering Conference on Nitrate and Water supply: Source and Control, February 11-12, 1970, University of Illinois, Urbana: Illinois University, College of Engineering Publication, p 6-13, 1970. 8 p, 6 fig.

Descriptors: *Nitrogen cycle, *Nitrogen, *Nitrates, *Nutrients, *Path of pollutants, Denitrification, Nitrification, Nitrogen compounds, Nitrogen fixation, Decomposing organic matter, Waste disposal.

Through electrical discharges in the atmosphere, nitrogen and oxygen combine to form nitrate which is carried by rain to soil for plant protein production. Herbiverous animals change plant protein to animal protein. Death of plants and animals produces organic matter on which bacteria act to release ammonia, nitrite, and nitrate. Nitrogen gas re-enters the atmosphere mainly through the reduction of nitrites. Certain bacteria and algae also fix nitrogen from the atmosphere to produce plant protein. Chemical fixation of nitrogen to ammonia and urea is used for land fertilization. The cycle of nitrogen compounds is shown schematically by the 'Nitrogen Wheel.' (See also W71-09952) (Knapp-USGS)
W71-09954

EXISTING LEVELS OF NITRATES IN WATER - THE CALIFORNIA SITUATION,
California State Dept. of Public Health, Berkeley.
Paul C. Ward.
Proceedings 12th Sanitary Engineering Conference on Nitrate and Water Supply: Source and Control, February 11-12, 1970, University of Illinois, Urbana: Illinois University, College of Engineering Publication, p 14-26, 1970. 13 p, 1 fig, 2 tab, 6 ref, append.

Descriptors: *Water quality control, *Nitrates, *California, *Water supply, Path of pollutants, Surface waters, Groundwater, Regulation, Water quality, Standards, Water pollution sources, Water utilization.
Identifiers: Nitrate standards.

Summaries of nitrate related groundwater investigations conducted in California are reported for six problem areas over the period from 1953 to 1968. In each instance, nitrate concentrations exceeded the USPHS recommended limit of 45 mg/1. The concentrations of nitrate in groundwater are monitored by water purveyors who have, by abandoning wells, putting wells on standby, and blending waters prior to distribution, reduced nitrates in delivered water. With increased use of groundwater predicted for the future, a steady state of nitrate concentration will eventually be reached. The question whether existing standards are valid or too conservative is being investigated as authorized by the 1969 California Legislature. (See also W71-09952) (Knapp-USGS)
W71-09955

THE HEALTH EFFECTS OF NITRATES IN WATER (PANEL DISCUSSION),
Bureau of Water Hygiene, Cincinnati, Ohio.
Elliot F. Winton.
Proceedings 12th Sanitary Engineering Conference on Nitrate and Water Supply: Source and Control, February 11-12, 1970, University of Illinois, Urbana: Illinois University, College of Engineering Publication, p 55-65, 1970. 11 p, 15 ref.

Descriptors: *Public health, *Illinois, *Nitrates, *Toxicity, *Water quality, Water pollution effects, Surveys, Sampling, Human pathology, Pathology, Safety.
Identifiers: Health effects (Nitrates).

The nitrate dosage received by an infant is influenced by method of formula preparation, the child's fluid intake, and additional sources of nitrate, nitrite and other methemoglobinemia-connected materials in food and medicine. Presence of bacteria from contaminated water or due to insufficient gastric acidity in the upper gastrointestinal tract of the infant are necessary for conversion of nitrate to nitrite prior to absorption through the intestinal lining. Levels of methemoglobin in infant blood are elevated due to the presence of nitrite susceptible Hemoglobin F in the first three to fourth months of life and an immature diaphorase enzyme system necessary for the conversion of methemoglobin to hemoglobin. Allowable levels of nitrate in drinking water should not be elevated because of additional sources of nitrate which may be present in the infants diet and the impracticality of relying on educating mothers to use proper methods of formula preparation and alternate supplies of water when the available supply contains excessive quantities of nitrates. (See also W71-09952) (Knapp-USGS)
W71-09957

SECONDARY EFFECTS OF NITROGEN IN WATER,
Michigan Univ., Ann Arbor. Dept. of Sanitary Engineering.
Jack A. Borchardt.

Proceedings 12th Sanitary Engineering Conference on Nitrate and Water Supply: Source and Control, February 11-12, 1970, University of Illinois, Urbana: Illinois University, College of Engineering Publication, p 66-77, 1970. 12 p, 9 fig, 1 tab, 10 ref.

Descriptors: *Water pollution effects, *Nitrates, *Nutrients, *Algae, *Bacteria, Aesthetics, Color, Taste, Corrosion, Diseases, Eutrophication, Fouling, Toxicity, Odor, Oxygen sag, Turbidity, Water quality, Water treatment, Nitrogen cycle.

One of the primary effects of inorganic nitrogen in natural waters is its influence on the growth of flora. Algae in water supplies can cause obnoxious conditions in storage reservoirs, clogging of intake screens, can seriously affect prechlorination, may make additional chemicals necessary for purification, may cause shorter filter runs, and may result in serious taste and odor problems. These problems are discussed in some detail. (See also W71-09952) (Knapp-USGS)
W71-09958

URBAN SOURCES OF NITRATES,
Bureau of Water Hygiene, Cincinnati, Ohio.
James M. Symons.
Proceedings 12th Sanitary Engineering Conference on Nitrate and Water Supply: Source and Control, February 11-12, 1970, University of Illinois, Urbana: Illinois University, College of Engineering Publication, p 78-85, 1970. 8 p, 1 fig, 3 tab, 11 ref.

Descriptors: *Water pollution sources, *Nitrates, *Cities, *Urbanization, Nutrients, Public health, Runoff, Sewers, Sewage, Waste water, Sewage treatment, Water supply, Water treatment, Water quality, Rainfall, Industrial wastes.
Identifiers: *Urban pollution sources.

Urban sources of nitrate, nitrite, ammonia, and organic nitrogen are discussed. The sources of urban nitrogen include human wastes from individual and central sewage systems, runoff from separate and combined storm water systems, rainfall, and industrial wastes. These sources are discussed in terms of the quantities and concentrations of readily biologically oxidizable nitrogen they contribute, and the degree of dilution each has to undergo to meet with the U.S.P.H.S. requirements for nitrate nitrogen in drinking water supplies. (See also W71-09952) (Knapp-USGS)
W71-09959

CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
Cornell Univ., Ithaca, N.Y. Dept. of Civil and Agricultural Engineering.
Raymond C. Loehr.
Proceedings 12th Sanitary Engineering Conference on Nitrate and Water Supply: Source and Control, February 11-12, 1970, University of Illinois, Urbana: Illinois University, College of Engineering Publication, p 177-189, 1970. 13 p, 4 fig, 1 tab, 22 ref. FWQA Project WP-1493.

Descriptors: *Farm wastes, *Nitrogen compounds, *Waste treatment, *Nitrification, *Denitrification, Confinement pens, Farm lagoons, Organic wastes, Waste water treatment, Biodegradation, Aeration, Aerobic treatment
Identifiers: *Nitrogen removal.

The trend in recent years for the confinement feeding of livestock and for increased numbers of animals per production unit results in highly concentrated, low-volume waste flows which represent a pollutional hazard to ground- and surface waters. The pollutional contribution from these activities is manifested by excessive nutrient concentrations, chiefly high levels of nitrogen, microbial impairment of surface waters, release of contaminents that complicate subsequent water treatment operations, and depletion of dissolved oxygen in surface waters. Control of such wastes commences with containment. The microbial synthesis which occurs during containment reduces nitrogen levels to a certain extent. Further removals can be accomplished by ammonia stripping using diffused aeration or by nitrification-denitrification. The most suitable method of disposal for treated wastes is on the land, where the remaining nutrients can be incorporated into crops. (See also W71-09952) (Knapp-USGS)
W71-09960

TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
Bureau of Water Hygiene, Cincinnati, Ohio.
Gordon G. Robeck.
Proceedings 12th Sanitary Engineering Conference on Nitrate and Water Supply: Source and Control, February 11-12, 1970, University of Illinois, Urbana: Illinois University, College of Engineering Publication p 190-194, 1970. 5 p.

Descriptors: *Water treatment, *Domestic water, *Nitrates, *Ion exchange, Filtration, Water purification, Coagulation, Distillation.
Identifiers: *Nitrate removal.

Removal of high levels of nitrates from drinking waters is strongly advocated by few health officials and nitrate removal is not generally practiced. High levels of nitrates (over 45 mg/liter) are usually encountered only through a short period of the year; some evidence indicates that the problem areas are more numerous with private wells than with public systems. Small demineralizing units for nitrate removal are available for household use. The units are expensive, but are useful for emergency situations. Distillation is a possible, but expensive, means of nitrate removal. Anaerobic filters have also been advocated for nitrate removal. Strong-base, anion exchange resins in the chloride form are promising agents for lowering nitrate levels. (See also W71-09952) (Knapp-USGS)
W71-09961

THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
Miami Univ., Fla. School of Marine and Atmospheric Sciences, and Liverpool Univ. (England). Dept. of Oceanography.
For primary bibliographic entry see Field 05A.
W71-09982

PESTICIDES IN THE MARINE ENVIRONMENT,
National Marine Water Quality Lab., West Kingston, R.I.
For primary bibliographic entry see Field 05C.
W71-09992

THE CONTRIBUTION OF URBAN AND AGRICULTURAL PESTICIDE USE TO THE CONTAMINATION OF THE RED CEDAR RIVER,
Matthew J. Zabik.
Available from the National Technical Information Service as PB-201 055, $3.00 in paper copy, $0.95 in microfiche. Michigan State University, Institute of Water Research Project Completion Report, 1969. 19 p, 12 fig, 3 ref. OWRR Project A-012-MICH (2).

Descriptors: *Pesticide residues, *DDT, *Michigan, *Water pollution sources, Bottom sediments, Suspended load, Sampling, Data collections, Persistence, Pesticide kinetics, Water pollution effects, Municipal wastes, Waste water treatment.

Analysis of 1,549 water samples shows that the Red Cedar River, Michigan, is highly contaminated with DDT and DDT metabolites (TDE and DDE). The river becomes progressively more contaminated in a downstream direction and shows seasonal variations. Pesticides in bottom samples show the amount of long term contamination, whereas those in the suspended matter (that retained by a 5 micron filter) show the amount of pesticide being carried on a short term basis. The largest amount of pesticide contamination entering the Red Cedar comes through waste water treatment plants. (Knapp-USGS)
W71-10035

CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (French: Considerations sur l'interaction entre les eaux de surface et souterraines du territoire du Delta du Danube),
Institutul de Medicina se Farmacia, Iasi (Rumania). Catedra de Igiena.
Gheorghe Zamfir, V. Nastase, Simone Apostol, Marie Srainer, and Marcelle Finichiu.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 415-422, 1970. 8 p, 2 tab, 5 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Water quality, *Surface-groundwater relationships, *Deltas, Coliforms, Aquatic microorganisms, Water pollution effects, Water chemistry, Salinity, Water wells, Groundwater movement, Path of pollutants.
Identifiers: *Danube Delta.

Communities on the territory of the Danube Delta use river water as their main supply of potable water. Danube water is characterized by a high microbial content (the highest values in certain seasons range between 220,000-700,000 germs/ml and 10,000-5,000,000 b/coli/liter by a moderate content of organic substances (13-19 mg/liter) by a fairly reduced mineralization (dry residue 200-300 mg/liter, chlorides up to 20 mg/liter and a total hardness between 12-16 german degrees). The water of the few wells in service shows a great chemical similarity to Danube water. This proves communication between the surface and the underground waters, a fact made conspicuous by the biological indicators. (Knapp-USGS)
W71-10054

MERCURY POLLUTION: INTEREST IN IT NOW ON THE UPSWING,
Industrial Pollution Control, Inc., Westport, Conn.
For primary bibliographic entry see Field 05C.
W71-10088

AN INTRODUCTION TO DETERMINATION OF ESTUARINE ASSIMILATIVE CAPACITY,
National Council of the Paper Industry for Air and Stream Improvement, Inc., New York.
Howard Edde.
Technical Bulletin No 236, 1970. 24 p, 3 fig, 43 ref, 1 append.

Descriptors: *Estuaries, *Waste assimilation capacity, *Diffusion, *Mixing, Biochemical oxygen demand, Tidal effects, Self-purification, Pulp and paper industry, Effluents, Oxygen sag, Reaeration, Analytical techniques, Water pollution control, Classification, Physical properties, Geomorphology, Biological properties, Dredging, Saline water intrusion, Channel improvement.
Identifiers: *Oxygen balance, Tidal prism, Turbulent transport coefficient, Deoxygenation rate constant.

Approaches are considered to the estimation of estuarine capacity to assimilate effluents of pulp and paper mills. The parameters of major importance include physical mixing factors, geological characteristics, effluent dispersion by tidal prism, estuarine diffusion, physical and biochemical interactions, dredging and its effect on salinity levels. The oxygen balance in estuaries is appraised on the basis of the equation for mass conservation and procedures for establishment of process coefficients. (Wilde-Wisconsin)
W71-10093

POLLUTION - HOW MUCH OF A PROBLEM COMES FROM FERTILIZERS,
Missouri Univ., Columbia. Water Resources Research Center.
For primary bibliographic entry see Field 05C.
W71-10099

THE DECOMPOSITION OF URIC ACID IN BUILT UP POULTRY LITTER,
Edinburgh Univ. (Scotland). School of Agriculture; and Edinburgh Univ. (Scotland). Dept. of Bacteriology.
Henrietta E. Schefferle.
Journal of Applied Bacteriology, Vol 28, No 3, 1965, p. 412-420. 1 tab, 6 ref.

Descriptors: *Farm wastes, *Decomposing organic matter, *Bacteria, Poultry, Aerobic bacteria, Nitrogen, Water pollution sources.
Identifiers: *Uric acid decomposition, Coryneform bacteria, Urease activity, Ammonia formation.

The decomposition of uric acid in built up poultry litter appears to be brought about almost exclusively by the action of aerobic bacteria. Organisms decomposing uric acid usually comprised about one quarter of the bacterial population. There were strains of coryne bacterium and less frequently strains of NOCARDIA, STREPTOMYCES, PSEUDOMONAS, ALCALIGENES, and ACHROMOBACTER. Uric acid was converted to ammonia by some of the organisms but only to urea by the majority. Hydrolysis of urea to ammonia could be brought about by strains of corynebacterium, Micrococcus, Alcaligines, Achromobacter, and cytophaga which had no action on uric acid. It is suggested that the ammoniacal smell and high alkalinity of built up poultry litter result largely from the decomposition of uric acid. The identity of the bacteria concerned is discussed. (Hazen-Iowa State)
W71-10107

SOIL CHEMICAL CHANGES AND INFILTRATION RATE REDUCTION UNDER SEWAGE SPREADING,
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
R. E. Thomas, W. A. Schwartz, and T. W. Bendixen.
Soil Science Society of America Proceedings, Vol 30, 1966, p 641-646. 11 fig, 3 tab, 18 ref.

Descriptors: *Infiltration, *Lysimeters, Waste water treatment, Waste water disposal, Permeation, Chemical oxygen demand, Anaerobic conditions, Biochemical oxygen demand, Aerobic conditions, Disposal, Laboratory tests.
Identifiers: *Soil-pore clogging, Applied sewage effects, Microbial activity, Infiltration rate.

Laboratory and field lysimeters were used to investigate the site and nature of soil-pore clogging under sewage spreading. The site of clogging was located by determining with a seepage meter the impedance profile at 0.5-cm depth intervals. Soil samples were analyzed for sulfide, iron, phosphate, total organic matter, polysaccharide and polyuronide to evaluate possible causative relationships. The infiltration rate loss exhibited three phases: Phase I, a slow reduction under aerobic conditions; Phase II, a rapid reduction under anaerobic conditions; and Phase III, a further gradual decline under anaerobic conditions. The primary site of clogging was the 0-1-cm depth of soil. Although sulfide was an indicator of anaerobic conditions it was not a primary cause of clogging. Accumulations of the other five measured constituents may contribute to clogging in both Phase I and Phase II. Organic matter was the only probable clogging agent to decline as the infiltration rate was partially recovered in a rest cycle. (Hazen-Iowa State)
W71-10108

POULTRY DUST: ORIGIN AND COMPOSITION,
Auburn Univ., Ala. Agricultural Experiment Station.
For primary bibliographic entry see Field 05A.
W71-10110

TRACE ELEMENTS IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.

Available from the National Technical Information Service as PB-201 266, $3.00 in paper copy, $0.95 in microfiche. WRSIC 71-202, July 1971. 287 p, 252 ref.

Descriptors: *Trace elements, *Water chemistry, *Water pollution, *Bibliographies, *Abstracts, Water quality, Data storage and retrieval, Publications, Documentation, Classification, Chemical analysis, Surface waters, Groundwater, Water analysis, Arsenic compounds, Boxon, Chromium, Cobalt, Molybdenum, Titanium.
Identifiers: Antimony, Arsenic, Barium, Beryllium, Bismuth, Cadmium, Nickel, Selenium, Silicon, Silver, Vanadium.

This bibliography, concerning trace elements in water, was retrieved from SELECTED WATER RESOURCES ABSTRACTS published through June 15, 1971 (Volume 4, Number 12) by Water Resources Scientific Information Center of the Office of Water Resources Research; U.S. Department of the Interior. The publication contains 252 abstracts. The sixteen trace elements considered were: Antimony, Arsenic, Basium, Beryllium, Bismuth, Baxon, Cadmium, Chromium, Cobalt, Molybdenum, Nickel, Selenium, Silicon, Silver, Titanium and Vanadium. Each bibliographic entry includes title, author, source, descriptors, identifiers, abstract, and accession number. A permuted keyword-in-title index precedes the bibliography. (See also W71-10191 thru W71-10196) (Woodard-USGS)
W71-10190

MERCURY IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.

Available from the National Technical Information Service as PB-201 267, $3.00 in paper copy, $0.95 in microfiche. WRSIC 71-207, July, 1971. 100 p.

Descriptors: *Heavy metals, *Water pollution, *Water chemistry, *Bibliographies, *Abstracts, Data storage and retrieval, Water quality, Publications, Documentation, Classification, Chemical analysis, Water analysis, Surface waters, Groundwater.
Identifiers: *Mercury.

This bibliography, concerning Mercury in water, was retrieved from SELECTED WATER RESOURCES ABSTRACTS published through June 15, 1971 (Volume 4, Number 12) by Water Resources Scientific Information Center of the Office of Water Resources Research, U.S. Department of the Interior. The publication contains 88 abstracts. Each bibliographic entry includes title, author, source, descriptors, identifiers, abstract, and accession number. A permuted keywork-in-title index precedes the bibliography. (See also W71-10190) (Woodard-USGS)
W71-10191

STRONTIUM IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.

Available from the National Technical Information Service as PB-201 268, $3.00 in paper copy, $0.95 in microfiche. WRSIC 71-201, Jun 1971. 80 p.

Descriptors: *Strontium radioisotopes, *Water pollution, *Bibliographies, *Water chemistry, *Abstracts, Data storage and retrieval, Publications, Documentation, Classification, Water analysis, Water quality, Chemical analysis, Surface waters, Groundwater, Water chemistry, Trace elements.
Identifiers: *Strontium, *Trace elements (Strontium).

This bibliography, concerning Strontium in water, was retrieved from SELECTED WATER RESOURCES ABSTRACTS published through June 15, 1971 (Volume 4, Number 12) by Water Resources Scientific Information Center of the Office of Water Resources Research, U.S. Department of the Interior. The publication contains 70 abstracts. Each bibliographic entry includes title, author, source, descriptors, identifiers, abstract, and accession number. A permuted keyword-in-title index precedes the bibliography. (See also W71-10190) (Woodard-USGS)
W71-10192

COPPER IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.

Available from the National Technical Information Service as PB-201 269, $3.00 in paper copy, $0.95 in microfiche. WRSIC 71-204, Jul 1971. 189 p.

Descriptors: *Copper, *Water pollution, *Water quality, *Bibliographies, *Abstracts, Trace elements, Documentation, Data storage and retrieval, Classification, Water supply, Publications, Chemical analysis, Water properties, Surface waters, Groundwater.
Identifiers: *Indexing.

This bibliography, concerning Copper in water, was retrieved from SELECTED WATER RESOURCES ABSTRACTS published through June 15, 1971 (Volume 4, Number 12) by Water Resources Scientific Information Center of the Office of Water Resources Research, U.S. Department of Interior. This publication contains 168 abstracts. Each bibliographic entry includes title, author, source, descriptors, identifiers, abstract, and accession number. A permuted keyword-in-title index precedes the bibliography. (See also W71-10190) (Woodard-USGS)
W71-10193

MANGANESE IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.

Available from the National Technical Information Service as PB-201 270, $3.00 in paper copy, $0.95 in microfiche. WRSIC 71-205, Jul 1971. 127 p.

Descriptors: *Manganese, *Water chemistry, *Bibliographies, *Water quality, *Abstracts, Data storage and retrieval, Publications, Documentation, Classification, Chemical analysis, Surface waters, Groundwater, Water analysis.
Identifiers: *Indexing.

This bibliography, concerning Manganese in water, was retrieved from SELECTED RESOURCES ABSTRACTS published through Jun 15, 1971 Volume 4, Number 12) by Water Resources Scientific Information Center of the Office of Water Resources Research, U.S. Department of the Interior. The publication contains 113 abstracts. Each bibliographic entry includes title, author, source, descriptors, identifiers, abstract, and accession number. A permuted keyword-in-title index precedes the bibliography. (See also W71-10190) (Woodard-USGS)
W71-10194

MAGNESIUM IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.

Available from the National Technical Information Service as PB-201 271, $3.00 in paper copy, $0.95 in microfiche. WRSIC 71-206, Jul 1971. 152 p.

Descriptors: *Magnesium, *Water chemistry, *Bibliographies, *Water quality, *Abstracts, Data storage and retrieval, Publications, Documentation, Classification, Chemical analysis, Surface waters, Groundwater, Water analysis.
Identifiers: *Indexing.

This bibliography, concerning Magnesium in water, was retrieved from SELECTED WATER RESOURCES ABSTRACTS published through Jun 15, 1971 (Volume 4 Number 12) by water Resources Scientific Information Center of the Office of Water Resources Research, U.S. Department of the Interior. The publication contains 134 abstracts. Each bibliographic entry includes title, author, source, descriptors, identifiers, abstract, and accession number. A permuted keyword-in-title index precedes the bibliography. (See also W71-10190) (Woodard-USGS)
W71-10195

ZINC IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.

Available from the National Technical Information Service as PB-201 272, $3.00 in paper copy, $0.95 in microfiche. WRSIC 71-208, Jul 1971. 138 p.

Descriptors: *Zinc radioisotopes, *Water chemistry, *Water analysis, *Bibliographics, *Abstracts, Water quality, Trace elements, Data storage and retrieval, Publications, Documentation, Classification, Chemical analysis, Surface waters, Groundwater, Water pollution.
Identifiers: *Zinc.

This bibliography, concerning Zinc in water, was retrieved from SELECTED WATER RESOURCES ABSTRACTS published through Jun 15, 1971 (Volume 4, Number 12) by Water Resources Scientific Information Center of the Office of Water Resources Research, U.S. Department of the Interior. The publication contains 119 abstracts. Each bibliographic entry includes title, author, source, descriptors, identifiers, abstract, and accession number. A permuted keyword-in-title index precedes the bibliography. (See also W71-10190) (Woodard-USGS)
W71-10196

TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
Virginia Inst. of Marine Science, Gloucester Point.
Michael Castagna, Dexter S. Haven, and James B. Whitcomb.
Proceedings of the National Fisheries Association, Vol 59, p 84-90, June, 1969. 1 fig, 4 tab, 6 ref.

Descriptors: *Water pollution sources, *Chemcontrol, *Oysters, *Chlorinated hydrocarbon pesticides, *Aquiculture, Commercial shellfish, Marine fisheries, Estuarine fisheries, Pest control, Rates of application, Chemicals, Organic compounds, Taste, Pesticide residues, Public health.
Identifiers: *Polystream, *Polychlorinated benzenes, Mariculture, Benzene, Cultch, Control, Chlorinated benzenes.

A commercial scale study was conducted on the eastern shore of Virginia during 1964, 1965 and 1966 to evaluate treatment of shell cultch with Polystream. Three intertidal reefs of the same approximate size were shelled with similar amounts of untreated shells. Results were evaluated for periods ranging up to 18 months on the basis of number of oysters attached per unit volume of shell; length and number of drilled oysters were also recorded. Treated shells consistently had more attached oysters than the controls at two of the plots. On the third, differences did not become apparent until the second year. Analysis suggests that treatment of cultch with Polystream by commercial growers may be economically feasible and may increase net profit. A Polystream residue of less than 0.1 ppm was found in oyster tissues. A taste panel could not distinguish between oysters grown on treated cultch and those grown on untreated cultch. Side ecological effects of the treatment were not discussed. (LeGore - Washington)
W71-10208

STATUS OF WATER QUALITY AND SIGNIFICANT SOURCES OF WASTE WATER DISCHARGES IN MARYLAND.
Maryland Dept. of Water Resources, Annapolis; and Maryland Dept. of Health and Mental Hygiene, Annapolis.
For primary bibliographic entry see Field 05G.
W71-10254

PESTICIDE POLLUTION,
For primary bibliographic entry see Field 05G.
W71-10264

WATER POLLUTION AND SELF-PURIFICATION STUDY ON THE PO RIVER BELOW FERRARA,
Ferrara Univ. (Italy). Istituto di Igiene.
L. Prati, and Q. B. Richardson.
Water Research, Vol 5, No 5, p 203-212, May 1971. 10 p, 5 fig, 10 tab, 18 ref.

Descriptors: *Self-purification, *Reaeration, *Path of pollutants, Biochemical oxygen demand, Waste assimilative capacity, Industrial wastes, Water pollution effects, Water pollution control.
Identifiers: *Po River (Italy).

From May to August 1969, samples were collected from a 30 km stretch of the Po River to determine the degree of pollution and the self-purification capacity of the river. The river below Ferrara is lightly polluted by organic substances. The deoxygenation rate was determined by the Isaacs and Gaudy method, and the atmosphere and the atmospheric reaeration data according to the equations of O'Connor and Dobbins. The atmospheric reaeration capacity was found to be very low, resulting in a low self-purification capacity for the river. The dissolved oxygen averaged 80 per cent of the saturation value; this value is attributed to the low organic load of the river and the high dilution ratio. Dilution of the river is the primary self-purification factor. (Knapp-USGS)
W71-10324

TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
Koninkliyke/Shell-Laboratorium, Amsterdam (Netherlands).
M. Van der Waarden, A. L. A. M. Bridie, and W. M. Groenewoud.
Water Research, Vol 5, No 5, p 213-226, May 1971. 14 p, 7 fig, 3 tab, 12 ref.

Descriptors: *Path of pollutants, *Leaching, *Soil water movement, *Oily water, *Groundwater recharge, Model studies, Hydraulic models, Oil wastes, Water pollution sources.
Identifiers: *Oil spills.

Oil spills in soils become immobile after some time. Subsequent rainfall may then leach out water-soluble components, which are carried downward. In laboratory experiments a pack of non-adsorbing glass particles was used as a soil model to study the transfer of oil components to groundwater. Oil was injected into a zone with residual water saturation of this model and allowed to disperse freely. Subsequently water was allowed to trickle through the pack and the drain water, which did not contain any free oil, was analyzed for contaminants. Experiments were carried out with a gas oil raffinate containing very small amounts of 2-isopropylphenol as a model for transferable components and with actual mineral oil products: gasoline, kerosene and gas oil. In all the experiments water-extractable components were leached out from an oil zone by trickling water at a rate determined by the partition coefficient of the components and by the water/oil ratio. When the glass particles were replaced by natural dune sand the transfer of oil components was delayed by adsorption and their concentration in the drain water decreased correspondingly. Under field conditions these effects of adsorption might be much stronger; in addition, chemical or biological oxidation and evaporation may also to some extent determine the fate of oil in soil. (Knapp-USGS)
W71-10325

TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
Northeastern Univ., Boston, Mass. Dept. of Civil Engineering.
Alvin S. Goodman, and Richard J. Tucker.
Water Research, Vol 5, No 5, p 227-241, May 1971. 15 p, 4 fig, 43 ref. FWPCA Grant No WP-01090.

Descriptors: *Mathematical models, *Path of pollutants, *Biochemical oxygen demand, *Dissolved oxygen, Water pollution, Water pollution control, Computer programs, Simulation analysis, Reaeration, Water quality, Coliforms, Chlorides.
Identifiers: Merrimack River (Mass).

By means of a mathematical model and an electronic digital computer, the variation of quality with distance and time was simulated for a 50 mile long stream. For a specified station, time profiles were traced in terms of BOD, DO, coliforms and chlorides. Input consisted of the types of data which are typically obtained from records and sanitary field surveys. Results may be used to predict the effectiveness of water pollution control programs and to study the suitability of a stream for fish propagation or other designated purpose. (Knapp-USGS)
W71-10326

ORGANIC CARBON AND NITROGEN IN THE SURFACE SEDIMENTS OF LAKES ONTARIO, ERIE, AND HURON,
Department of Energy, Mines and Resources, Burlington (Ontario). Canada Center for Inland Waters.
For primary bibliographic entry see Field 05A.
W71-10327

2ND COMPENDIUM OF ANIMAL WASTE MANAGEMENT.
Federal Water Pollution Control Administration, Kansas City, Mo. Missouri Basin Region.
For primary bibliographic entry see Field 05G.
W71-10366

ANIMAL WASTES--A MAJOR POLLUTION PROBLEM,
Iowa Univ., Iowa City. Dept. of Civil Engineering.
For primary bibliographic entry see Field 05G.
W71-10368

CONTRIBUTION OF FERTILIZERS TO WATER POLLUTION,
Missouri Univ., Columbia. Water Resources Research Center.
For primary bibliographic entry see Field 05G.
W71-10372

MAJOR PROBLEMS OF WATER POLLUTION CREATED BY AGRICULTURAL PRACTICES,
Federal Water Pollution Control Administration, Kansas City, Mo.
For primary bibliographic entry see Field 05G.
W71-10374

AGRICULTURE AS A SOURCE OF WATER POLLUTION,
Federal Water Pollution Control Administration, Charlottesville, Va. Middle Atlantic Region.
For primary bibliographic entry see Field 05G.
W71-10375

5C. Effects of Pollution

NITRATES IN WATER SUPPLIES - THE PROBLEM,
California Univ., Berkeley. Dept of Sanitary Engineering.
For primary bibliographic entry see Field 05B.
W71-09953

THE HEALTH EFFECTS OF NITRATES IN WATER (PANEL DISCUSSION),
Bureau of Water Hygiene, Cincinnati, Ohio.
For primary bibliographic entry see Field 05B.
W71-09957

SECONDARY EFFECTS OF NITROGEN IN WATER,
Michigan Univ., Ann Arbor. Dept. of Sanitary Engineering.
For primary bibliographic entry see Field 05B.
W71-09958

MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
Florida State Univ., Tallahassee. Dept. of Oceanography.
Robert C. Harriss, David B. White, and Robert B. MacFarlane.
Science, Vol 170, p 736-737, 13 November, 1970. 2 fig, 5 ref.

Descriptors: Water pollution effects, *Fungicides, *Heavy metals, *Inhibitors, *Photosynthesis, *Primary productivity, *Inhibition, Metals, Chemical wastes, Poisons, Toxins, Toxicity, Plant physiology, Biochemistry, Lethal limit, Metabolism, Pesticides.
Identifiers: *Mercury, *Organomercurials, *Mercury compounds, Acute toxicity, Nitzschia sp.

Concentrations of organomercurial fungicides as low as 0.1 ppb in water reduced photosynthesis and growth in laboratory cultures of one species of marine diatom (Nitzschia delicatissima) and several natural phytoplankton communities from Florida lakes. The acute toxicity of mercury compounds to phytoplankton is dependent on the chemical nature of the mercury compound and on cell concentrations. (LeGore - Washington)
W71-09980

AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
Food and Agriculture Organization of the United Nations, Rome (Italy).
William A. Dill.
FAO Fisheries Circular No. 124, March, 1971. 9 p, 47 ref.

Descriptors: *Bibliographies, *United Nations, *Water quality, Water conservation, Water law, Water policy, Water utilization, Water pollution effects, *Fish, *Freshwater fish, *Radioisotopes, *Sewage, Reviews, Documentation, Information retrieval, Publications, Food chains, Aquatic food chains, Fish farming, Pesticides.
Identifiers: *Food and Agriculture Organization, FAO, Annotated bibliographies.

This list include references to the United Nations Food and Agriculture Organization's (FAO) special studies or reviews on the subject of water quality and quantity for fish life, the behavior of radioactive substances in terrestrial and aquatic environments and food chains, reviews of water pollution control legislation and administrative practices, the use of sewage water for irrigation and fish culture, its policies on pesticides and fish and other matters. (LeGore - Washington)
W71-09981

DDT RESIDUES IN MARINE PHYTOPLANKTON: INCREASE FROM 1955 TO 1969,
Hopkins Marine Station, Pacific Grove, Calif.
For primary bibliographic entry see Field 05A.
W71-09984

EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
Australian National Univ., Canberra. Dept. of Zoology.
A. H. Weatherley.
The Biological Bulletin, Vol 139, No 1, p 229-238, August 1970. 3 fig, 2 tab, 14 ref.

Descriptors: *Dissolved oxygen, *Water temperature, *Heat resistance, *Thermal stress, *Physiological ecology, *Fish physiology, *Oxygenation, Water pollution effects, Biochemical oxygen demand, Lethal limit, Heated water, *Thermal pollution, Thermophilic animals, Bioassay, Environmental effects, Absorption, Aeration, Fish management.
Identifiers: Oxygen tension, Goldfish.

Experiments were performed to test the hypothesis that the lethal temperature of goldfish may be affected by failure of the oxygen supply system. The method used was to augment the normal oxygen supply with the expectation that a superabundance of oxygen might ensure ready entry of oxygen into the fish through the entire body surface. Functional failure of the respiratory, circulatory or oxygen transport systems would be compensated, therefore, by saturation of blood serum, lymph, tissue fluids, etc., with oxygen. Results generally indicate that survival was better in oxygen-rich water than in air-saturated water, and that the upper lethal temperature is closely related to oxygen tension. (LeGore - Washington)
W71-09985

REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
Virginia Polytechnic Inst., Blacksburg. Dept. of Biology.
John Cairns, Jr., and Kenneth L. Dickson.
Transactions of the Kansas Academy of Science, Vol 73, No 1, p 1-10, Spring, 1970. 2 fig, 7 tab, 1 ref.

Descriptors: *Copper, *Metals, Water pollution effects, *Ions, *Protozoa, *Toxins, Biological communities, Density, Environmental effects, Mortality, Microorganisms, Antiprotozoals (Pesticides), Aquatic microorganisms, Resistance, Physiological ecology, Bioassay, Pollutants, Toxicity, Succession.
Identifiers: *Zinc, Species diversity, Population density, Acute exposure, Protozoan communities, Antiprotozoals.

Protozoan communities established in plastic troughs through which Douglas Lake (Michigan) water was pumped were exposed for 24 hr to either 24 ppm of Zn.... or 24 ppm of Cu..... The number of species and approximate density of protozoans in each trough were determined before and after the Zn or Cu was introduced. These results were then compared to those obtained for controls receiving identical treatment except for the omission of heavy metal. The results of the Cu.... test show a reduction from 46 to 7 species at the end of the 24 hr exposure, with a partial recovery to 14 species 144 hr after the test began. The results of the Zn.... test show a reduction in species from 35 to 11 after the 24 hr exposure, with a comparatively rapid recovery to 20 species at 48 hr, 30 at 72 hr, 32 at 96 hr and 34 at 120 hr. Density changes were not as striking as the reduction in number of species. These preliminary experiments indicate that the residual effects of copper seem to be considerably greater than the residual effects of zinc. (LeGore - Washington)
W71-09987

MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
Fisheries Research Board of Canada, St. Andrews (New Brunswick). Biological Station.
J. B. Sprague.
Water Research, Vol 4, p 3-32, 1970. 8 fig, 134 ref.

Descriptors: *Reviews, *Toxicity, *Bioassay, *Analytical techniques, *Lethal limit, Water pollution effects, *Forecasting, Water pollution sources, Bioindicators, Laboratory animals, Pollutant identification, Effects, Fishkill, Pollutants, Rainbow trout, Statistical methods, Fluctuation, Toxins, Water pollution control.
Identifiers: LC-50, Incipient LC-50, Synergism, Antagonism, Multivariable analysis, Pollutant identification, Acute toxicity, Chronic toxicity.

It is now possible to predict the toxicity of mixtures of two or more pollutants on the basis of chemical measurements. Toxicities of individual components may be added as fractions of the incipient LC-50. Total toxicity of the mixture is expressed as a single number. A standard terminology is given for the effects of two or more toxicants acting simultaneously. Modifying conditions greatly affect toxicity, and concise summaries for estimating the modifying effects have been published for rainbow trout. Computerized multivariable analysis is a promising tool, especially for studies of sublethal toxicity. Effects of fluctuating concentrations of toxicants may be evaluated by four approximations, although the theoretical basis for understanding effects still seems unproven. Acclimation to toxicants should be studied in detail for representative pollutants. With invertebrates and algae, as much as with fish, tests of sublethal effects such as growth and development are often more meaningful that tests of acute toxicity. (LeGore - Washington)
W71-09989

COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
Missouri Univ., Columbia. Dept. of Zoology.
Owen T. Lind, and Robert S. Campbell.
Transactions of the American Fisheries Society, Vol 99, No 3, p 577-582, July, 1970. 2 fig, 4 tab, 14 ref.

Descriptors: *Strip mine lakes, *Acidic water, *Alkaline water, Water pollution effects, *Respiration, *Photosynthesis, *Primary productivity, *Biological communities, *Hydrogen ion concentration, *Phytoplankton, *Aquatic productivity, Acid mine water, Mine acids, Water pollution sources, Strip mines, Metabolism, Plant physiology, Ecotypes, Environmental effects, Ecosystems, Missouri, Texas, Lakes, Plankton.
Identifiers: *Community metabolism, Species diversity, Aquatic communities.

Community metabolism was measured over a 24 month period by a modified diel oxygen procedure in three Missouri strip-mine lakes, one acid and two formerly acid. Water pH ranged from 3.2 to 8.1. Biotic diversity was inversely related to acidity. Maximum daily values of gross photosynthesis were similar in the lakes (7.9, 7.6 and 6.5 g O2/m2/day), but the highest rates of annual gross volumetric photosynthesis (586 and 682 g O2/m3/yr) were found in the more nearly eutrophic alkaline lake. Community respiration values, which were reasonably similar in the lakes, were considerably lower than in ponds and Texas coastal bays of similar photic depth. Rates of community respiration closely paralleled gross photosynthesis so that the photosynthesis:respiration ratio of each lake fluctuated about unity. Community function in these acid and alkaline strip-mine lakes, judged by rates of photosynthesis and respiration, compares

favorably with community function in non-acid natural waters. (LeGore - Washington)
W71-09990

HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
Szkola Glowna Gospodarstwa Wiejskiego, Warsaw (Poland). Dept. of Zoology.
J. Hempel-Zawitkowska.
Polish summary. Polskie Archiwum Hydrobiologii (Polish Archives of Hydrobiology), Vol 16, No 29, p 105-114, 1969. 6 fig, 1 tab, 14 ref.

Descriptors: Water pollution effects, Saline water, *Salinity, *Salts, *Brackish water, Resistance, *Hatching, *Ions, *Osmosis, *Fish eggs, Sea water, Water quality, Aqueous solutions, Saline water systems, Estuaries, Estuarine fisheries, Fish types, Encroachment, Biological membranes, Sodium chloride, Potassium compounds, Magnesium compounds, Calcium compounds, Bioassay, Lethal limit, Chlorides, Sulfates, Inorganic compounds.
Identifiers: Triops sp., Branchiopoda.

Eggs of Branchiopoda show a pronounced potential for adaptation to varying environmental factors, although effects are demonstrable. This paper is an attempt to find if the saline environment affects the eggs via osmotic imbalance or if egg development also depends on the ion composition of its environment. Eggs of Triops cancriformis developed in solutions of NaCl, KCl, CaCl2, K2SO4, and MgSO4 at concentrations of 5-50%. Solutions of K2SO4 and MgSO4 were most suitable for hatching; the least suitable were NaCl and KCl. The shorter the period of exposure, the higher the level of egg hatchability. (LeGore - Washington)
W71-09991

PESTICIDES IN THE MARINE ENVIRONMENT,
National Marine Water Quality Lab., West Kingston, R.I.
Ronald Eisler.
Underwater Naturalist, p 11-13, fall, 1968. 1 fig, 22 ref.

Descriptors: *Reviews, *Pesticides, *Pesticide kinetics, *Pesticide residues, *Pesticide toxicity, Water pollution effects, DDT, Chemicals, Water pollution control, Chemcontrol, Pesticide drift, Water pollution sources, Pollution abatement, Legal aspects, Monitoring, Legislation.
Identifiers: Pesticide pollution.

This is a general review of the nature of the present pesticide problem. Subjects discussed include the rationale for the use of pesticides, their nature and some demonstrated harmful side effects, and the problems inherent in establishing suitable guidelines for the protection of marine and brackish water organisms against pesticide pollution. Problems in data interpretation are also stressed. (LeGore-Washington)
W71-09992

FIRE ANTS, HEPTACHLOR, AND FISH KILL,
Lamar State Coll. of Tech., Beaumont, Tex. Dept. of Biological Sciences.
Jack Boudreaux, Kirk Strawn, and Gerald Callas.
The Southwestern Naturalist, Vol. 3, p 7-12, June 1, 1959.

Descriptors: *Heptachlor, *CHemcontrol, *Fishkill, *Pesticide drift, *Pesticide toxicity, Water pollution effects, *Fish toxins, Lethal limit, Poisons, Toxins, Toxicity, Water pollution sources, Water pollution control, Abatement, Physiological ecology, Mortality, Fish physiology, Fish conservation, Fish management, Farm ponds, Environmental effects, Wildlife management, Pollutants, Water pollution.
Identifiers: *Fire ant control, Fire ants.

Twenty pounds of 10% heptachlor were applied per acre on the northern half of the Fralise Farm near Sour Lake, Texas. Fishkill was heavy and continued for over three weeks. Young fish died first. The few survivors were usually large and, except for shad and gambusia, were thin. Two months after the poisoning, larvae of several species were found, and the populations of fishes appeared to be on the way to recovery. During a later treatment of the southern part of the farm, extreme care was taken to avoid contamination of water with heptachlor, and fishkill was avoided. (LeGore-Washington)
W71-09993

FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
Farbenfabriken Bayer A.G., Elberfeld (West Germany).
For primary bibliographic entry see Field 05A.
W71-09994

IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
Farbenfabriken Bayer A.G., Elberfeld (West Germany). Inst. of Parasitology and Veterinary Medicine.
For primary bibliographic entry see Field 05A.
W71-09995

DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
Farbenfabriken Bayer A.G., Elberfeld (West Germany). Chemotherapeutic Inst.
For primary bibliographic entry see Field 05A.
W71-09997

THE CONTRIBUTION OF URBAN AND AGRICULTURAL PESTICIDE USE TO THE CONTAMINATION OF THE RED CEDAR RIVER,
For primary bibliographic entry see Field 05B.
W71-10035

INTERRELATIONS OF SEVERAL ABIOTIC FACTORS AND THE HIGHER AQUATIC PLANTS IN A STREAM ECOSYSTEM,
Michigan State Univ., East Lansing, W.K. Kellogg Biological Station.
Russell G. Kullberg.
Available from the National Technical Information Service as PB-201 056, $3.00 in paper copy, $0.95 in microfiche. Michigan State University, Institute of Water Research Project Completion Report, November 1969. 9 p, 7 fig, 2 tab, 17 ref. OWRR Project A-025-MICH (1).

Descriptors: *Aquatic plants, *Bioindicators, *Michigan, *Water pollution effects, Sewage, Sludge, Turbidity, Morbidity, Water quality.
Identifiers: *Portage Creek (Mich).

In a preliminary study of the macrophytes in Portage Creek, Michigan distribution patterns were determined in relation to abiotic factors by the parameters of substrate cover and weight. Portage Creek shows the effect of industrial and urban effluents on a stream ecosystem, since the water flows from areas supporting a trout population to areas of gross pollution where only sewage fungi and bacteria grow. Oxygen content was reduced to some extent following the addition to the stream of the paper mill effluent, and it was further reduced near the Kalamazoo River. In the reach of the stream during which the oxygen was reduced, sewage sludge was extensive. Paper mill effluents have a profound effect on the macrophytes, that is, their complete elimination. The effect the individual additives would have on the macrophytes is not readily apparent, although upon cursory examination of the data and visual examination of the water it would appear the tenfold increase in turbidity would be the most obvious factor. (Knapp-USGS)
W71-10036

PRIMARY PRODUCTIVITY MEASUREMENTS AT DEVILS LAKE, NORTH DAKOTA,
North Dakota Univ., Grand Forks. Dept. of Biology; and North Dakota Univ., Grand Forks. Dept. of Geology.
Richard Armstrong, David W. Anderson, and Edward Callender.
Proceedings of the North Dakota Academy of Sciences, Vol 20, p 136-149, 1966. 7 fig, 1 tab, 15 ref. OWRR Project No A-006-NDAK (1).

Descriptors: *Primary productivity, Measurement, Phytoplankton, Sediments, Lake morphology, Light, Nannoplankton, Seasonal, Nitrates, Phosphorus, Oxygen, Carbonates, Bicarbonates, Respiration, Iron, Thermal stratification, Temperature, Copepods, Diatoms, Winds, Salinity, Pollutants, Zooplankton, Diptera, Salamanders, Hydrology, Photosynthesis, Sediments, Oxygen, North Dakota.
Identifiers: *Devils Lake (ND), Morphometry, Transparency, Absorbance, Enteromorpha prolifera, Ambystoma tigrinum, Cladophora, Cyclotella.

Primary productivity, providing the focal point for interpretation of other lake processes, was studied at Devils Lake, North Dakota. Influenced by lake morphometry and drainage basin geology and hydrology, carbon fixation provides the best estimate of the rate at which matter moves through biogeochemical cycles. The population dynamics within the biota of the lake are the dynamics of dispersal of energy originally concentrated by photosynthesis. Continuous observations of a control area were made and instantaneous production rates by littoral species estimated, primary productivity of planktonic algae measured by the light-dark bottle method, phytoplankton populations and transparency of water estimated, water temperatures measured, sediment samples (mud-water interface) obtained, and phosphorus, iron, silica, nitrate, ammonia, and organic nitrogen measured. The dominant phytoplankter was a diminutive diatom (Cyclotella). The mean gross phytoplankton productivity during the 175-day study period was 0.80 grams carbon/sq m per day. An important relationship exists between plankton community and sediments. Significant finding of this study is circumstantial evidence that ultraplanktors are responsible for virtually all productivity in Devils Lake. (See also W71-10063). (Jones-Wisconsin)
W71-10062

ZOOPLANKTON-PHYTOPLANKTON RELATIONSHIPS IN DEVILS LAKE, NORTH DAKOTA,
North Dakota Univ., Grand Forks. Dept. of Biology.
David W. Anderson, and Richard Armstrong.
Proceedings of the North Dakota Academy of Science, Vol 20, p 158-168, 1966. 5 fig, 2 tab, 9 ref. OWRR Project No A-006-NDAK (2).

Descriptors: *Zooplankton, *Phytoplankton, Energy budget, Standing crop, Energy transfer, Trophic level, Balance of nature, Seasonal, Biomass, Photosynthesis, Grazing, Sampling, Productivity, Herbivores, Rotifers, Crustaceans, Sediments, Mud, Primary productivity, Carbon, Respiration, Oxygen, Diatoms, Copepods, Organic matter, North Dakota.
Identifiers: *Devils Lake (ND), Cyclotella, Coelcosphaerium, Oocystis, Gomphosphaerium, Navicula, Ankistrodesmus, Amphora, Surirella, Rhoicosphenia, Meridion, Cladocera.

Phytoplankton and zooplankton samples from Devils Lake (North Dakota) were collected biweekly for 10 months of 1965-1966 from ten stations during ice-free months and monthly from four stations during ice cover period. Phytoplankton cells, microscopic rotifers, and crustaceans were

enumerated. Phytoplankton cell surface areas and volumes were converted to carbon weight by assuming each cubic centimeter of volume contained 0.125 grams carbon. Values for standing crop of reduced carbon/sq m were calculated by multiplying carbon concentration per cubic meter by mean depth. Zooplankton/cu m were converted to milligrams/carbon sq m by weighing known numbers of dried specimens and assuming a carbon content of 45% dry weight. Cyclotella accounted for at least 95% of phytoplankton biomass and thus used as a basis for calculations of phytoplankton carbon standing crop. Energy present as standing crop in both trophic levels at different times of the year is compared with energy captured by photosynthesis. The energy budget for the entire period showed a net loss of potential energy from the system even though total annual gross production was rather high. Zooplankton grazing was the most important factor controlling phytoplankton standing crop size. (See also W71-10062) (Jones-Wisconsin)
W71-10063

ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM: I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (With German summary),
Pittsburg Univ., Pa. Pymatuning Lab. of Ecology; and Michigan State Univ., Hickory Corners. W. K. Kellogg Biological Station.
William P. Coffman, Kenneth W. Cummins, and John C. Wuycheck.
Archiv fur Hydrobiologie, Vol 68, No 2, p 232-276, 1971. 8 fig, 13 tab, 36 ref. OWRR Project Nos A-032-MICH (1) and B-008-MICH (1).

Descriptors: *Streams, *Standing crop, *Trophic level, *Energy budget, Productivity, Herbivores, Carnivores, Ecosystems, Aquatic life, Sampling, Algae, Laboratory tests, Detritus, Benthos, Aquatic animals, Diatoms, Insects, Bacteria, Fungi, Turnovers.
Identifiers: *Riffle benthos, Woodland stream, Ecosystem analysis, Macroconsumers, Autumnal community, Calories, Detrivores, Linesville Creek (Pa).

To determine an energy budget for a lotic ecosystem, a 2-year intensive investigation of a woodland stream was conducted of the autumnal benthic macroconsumer community of the riffle area. Standing crop and trophic structure were determined and production parameters estimated. The procedure was developed to express levels on the basis of tissue support rather than species categories. Trophic analyses were made from gut contents, and the data determined the proportion of each size class of each species to be assigned to one of three trophic levels. On an instantaneous ingestion basis, 17% to 21% of the standing crop tissue was supported by algal calories, 2% to 5% by detrial calories, and 71% to 73% by animal calories. The assimilative efficiency for ingested food is dependent upon species enzyme systems and varies in relation to differences in ingestive mechanisms. The high support by animal calories demands a rapid biomass turnover (less than a month) by the herbivore-detritivore component and a slower turnover (several months) by the carnivore tissue. The standing crop and trophic structure recorded yield a consistent picture over time. (Jones-Wisconsin)
W71-10064

ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
Ohio State Univ., Columbus. Dept. of Microbial and Cellular Biology.
Walter O. Leshniowsky, Patrick R. Dugan, Robert M. Pfister, James I. Frea, and Chester I. Randles.
International Association of Great Lakes Research, Proceedings 13th Conference Great Lakes Research, p 611-618, 1970. 5 fig, 18 ref. OWRR Project No B-013-OHIO (3).

Descriptors: *Adsorption, *Organic pesticides, *Sediments, Lakes, *Chlorinated hydrocarbon pesticides, Aerobic bacteria, Lake Erie, Aldrin, Flocculation, Path of pollutants, Toxicity, Laboratory tests, Silts, Clays, Microorganisms.
Identifiers: *Microbial floc.

The fate of chlorinated hydrocarbon pesticides in the water column and their adsorption to silt and floc forming bacteria was studied. Of 38 aerobic bacteria isolated from Lake Erie, 14 formed flocs in at least one of six different media. Two of these floc formers and lake silt were examined by gas liquid chromotography to determine their ability to accumulate and concentrate aldrin from solution. Bacterial flocs adsorbed aldrin from solution giving a 625X concentration factor within 20 minutes with no further concentration with time. Microscopic examination of contemporary Lake Erie sediment samples indicated that sediment adsorption of aldrin was similar to bacterial flocs; sediments revealed a conglomerate of bacteria, diatoms, inorganic and detrital particulates. Floc forming microbes settling from a water column remove pesticides and represent a natural purification process. Once settled from suspension the fate of pesticides is in question, but they may be degraded under anaerobic conditions. It is likely that pesticide concentrations in bottom sediments even for short periods exert an insecticidal effect on susceptible fauna, which may explain the disappearance of certain insects (mayflies) from Lake Erie and the persistence or increase of other insects and organisms. (Jones-Wisconsin)
W71-10065

A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
Memorial Univ. of Newfoundland, St John's. Dept. of Biology; and Laval Univ. Quebec. Departement de Biologie.
G. Robin South, and Andre Cardinal.
Canadian Journal of Botany, Vol 48, p 2077-2095, 1970. 1 fig, 132 ref, index.

Descriptors: *Marine algae, *Systematics, *Coasts, Benthic flora, Rhodophyta, Phaeophyta, Chlorophyta, Maine, Speciation.
Identifiers: *Checklist, *Eastern Canada, Cape Chidley (Labrador), New Brunswick, Anticosti Island (Quebec), Magdalen Island (Quebec), Sable Island (Nova Scotia), St Pierre (Canada), Miquelon (Canada), Mikrosyphar porphyrae, Protectocarpus speciosus.

A comprehensive checklist documenting marine benthic algae within the political boundaries of eastern Canada is presented. Taylor's second edition (1957) forms the basic reference for this list which includes all previously published records together with some new ones, incorporating nomenclatural changes that have occurred since 1957. It consists of 371 species, subspecies, and varieties from eastern Canada, including 157 Rhodophyceae, 127 Phaeophyceae, and 87 Chlorophyceae. Records for the entire coastline from Cape Chidley, Labrador, in the north to the New Brunswick-Maine border in the south are included, as well as from Anticosti Island, Magdalen Island, Sable Island, and St Pierre and Miquelon. Mikrosyphar porphyrae Kuck, and Protectocarpus speciosus (Berg) Kuck are new records for the area. The complete author citation for each genus and species is given together with extensive explanatory notes giving synonyms and previous author notes, 132 references, and an index to the genera. (Jones-Wisconsin)
W71-10066

PARTICLE SIZE, WATER-STABLE AGGREGATES, AND BACTERIAL POPULATIONS IN LAKE SEDIMENTS,
Dalhousie Univ., Halifax (Nova Scotia). Inst. of Oceanography.
D. Tsernoglou, and E. H. Anthony.
Canadian Journal of Microbiology, Vol 17, No 2, p 217-227, 1971. 5 fig, 7 tab, 39 ref.

Descriptors: *Particle size, *Aggregates, *Bacteria, *Sediments, Population, Lakes, Organic matter, Analysis, Analytical techniques.

Coulter counter analyses revealed significant differences in water-stable aggregates of ten lake sediments. Logarithms of the heterotrophic bacterial population were directly correlated with medians of size particles. The bacterial density varied from 3000 to 15,000 cells/sq ml of particle surface. An inverse relationship was established between median sizes of untreated and hydrogen peroxide treated sediments. (Wilde-Wisconsin)
W71-10069

SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
Indian Agricultural Research Inst., New Delhi. Div. of Microbiology.
Paromita Bose, Ujjal Singh Nagpal, G. S. Venkataraman, and S. K. Goyal.
Current Science, Vol 40, No 7, p 165-166, 1971. 1 tab, 22 ref.

Descriptors: *Phosphates, *Solubility, *Cyanophyta, Algae, Cultures.
Identifiers: *Tricalcium phosphates, Anabaena, Nostoc, Tolypothrix tenuis, Aulosira fertilissima, Anacystis nidulans.

Twenty-seven strains of nitrogen-fixing blue-green algae and one non-nitrogen-fixing alga, Anacystis nidulans, were incubated for 15 days in a nutrient medium containing tricalcium phosphate. Resulting determinations revealed that 17 strains, belonging to the genera Anabaena, Nostoc, Tolypothrix, and Aulosira, were effective in solubilization of rock phosphate. The solubilization efficiencies indicated by Tolypothrix tenuis and Aulosira fertilissima are of particular interest. (Wilde-Wisconsin)
W71-10070

PHYTOPLANKTON COEFFICIENTS AS A METHOD OF DEFINING THE DEGREE TO WHICH WATER HABITATS ARE TROPHIC (In Polish),
Instytut Rybactwa Srodigdowego, Olsztyn-Kortowo (Poland). Zaklad Hydrobiologii.
Jozefa Poltoracka.
English summary. Ekologia Polska, Seria B, Vol 5, No 2, p 119-128, 1969. 2 tab, 12 ref.

Descriptors: *Trophic levels, *Phytoplankton, *Eutrophication, Reviews, Bioindicators, Analytical techniques, Water analysis.
Identifiers: Phytoplankton coefficients.

A critical review of literature concerned with the increasingly frequent use of phytoplankton coefficients introduced by Thunmark (1945) and Nygaard (1949) for assessing the trophic levels of water habitats is presented. The analysis reveals a limited significance of these indices when applied to water habitats located in different parts of the world. (Wilde-Wisconsin)
W71-10075

DISSOLVED ORGANIC MATTER AND PHYTOPLANKTONIC PRODUCTIVITY IN MARL LAKES,
Michigan State Univ., Hickory Corners. W. K. Kellogg Biological Station.
Robert G. Wetzel.
Mitteilungen Internationale Vereinigung fur Theoretische und Angewandte Limnologie, Vol 14, p 261-270, 1968. 1 fig, 1 tab, 40 ref. NSF Grant GB-1452.

Descriptors: *Phytoplankton, *Algae, *Primary productivity, *Organic matter, Nutrients, Lakes, Water properties, Bacteria, Bioassay, Metabolism, Absorption, Competition, Oligotrophy, Vitamins, Heavy metals, Toxicity, Diatoms, Marl.
Identifiers: *Marl lakes, Dissolved organic matter, Arctic algae, Autotrophic metabolism, Heterotrophy, Crooked Lake (Ind), Little Crooked Lake (Ind).

The high efficiency of bacteria in utilization of dissolved organic matter deprives algae of energy material and depresses their growth. An important part in the competition of the two groups of organisms is played by chelation influencing the availability of nutrients, their ratio, and potency of toxicants. These relationships were elucidated by bioassays conducted simultaneously in two connected hard water lakes containing different concentration of dissolved organic matter. (Wilde-Wisconsin)
W71-10079

RECENT AND POSTGLACIAL PRODUCTION RATES OF A MARL LAKE,
Michigan State Univ., Hickory Corners. W. K. Kellogg Biological Station.
Robert G. Wetzel.
Limnology and Oceanography, Vol 15, No 4, p 491-503, 1970. 8 fig, 36 ref.

Descriptors: *Primary productivity, *Sediments, Pigments, Lakes, Cholorophyll, Analytical techniques, Paleolimnology, Carbonates, Sedimentation rates, Marl.
Identifiers: Pigment degradation, Marl lakes, Pretty Lake (Ind).

Pigment degradation products of C-14 dated sediments located in the central depression and on a lakemount of a hard water lake were studied. Spectrophotometric analyses established a relationship between the pigment degradation, the content of organic matter, and other paleolimnological indices of productivity. The maximum of degradation products per g of organic matter was after the Boreal period. An indirect relation was detected between chlorophyll degradation products and carbonate levels. The rates of sedimentation at the central depression accelerated, while those of the marl lakemount, formed probably by an irregularity in the iceblock, fluctuated sigmoidally. (Wilde-Wisconsin)
W71-10080

TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II): (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
University of Southern California, Los Angeles. Dept. of Biological Sciences.
William D. Shirley, and Yuk-maan Leung.
Available from the National Technical Information Service as AD-716 550, $3.00 in paper copy, $0.95 in microfiche. Technical Report No 3, 1970. 54 p, 25 fig, 11 plates, 33 ref. ONR NR 307-270.

Descriptors: *Arctic, *Zooplankton, Depth, Sites, Distribution, Systematics.
Identifiers: *Central Arctic, *Taxonomic guides, *Medusae, *Siphonophores, *Ctenophores, Morphology.

This comprehensive and practical taxonomic guide is designed for those involved with arctic fauna, especially of the Arctic Basin, and are not necessarily taxonomists. Research carried on since 1952 gives details on 15 species of medusae, 5 species of siphonophores, and 3 species of ctenophores. Plankton samples were taken from the Tracks of the Drift Stations ARLIS I 1960-61 and ARLIS II 1961-65. Recent collections taken with a 2 meter Umbrella Net and with 1 meter closing nets were considered for species possibly missed with previously used 1/4 and 1/2 meter nets. Recent collections from Ice Island, T-3, were made for species of Ctenophores. The specimens came from 1582 of 3028 stations at different times of the year. Emphasis has been placed upon fully-developed individuals. There are drawings of all species and a dichotomous key for all medusae. Parahysomedusa reesi is described as a new species. Plates showing relative distribution of major species (geographically and by depth) in the Central Arctic are included, together with notes, glossary and 33 references. (Jones-Wisconsin)
W71-10082

DISSOLVED ORGANIC PHOSPHORUS EXCRETION BY MARINE PHYTOPLANKTON,
North Carolina Univ., Chapel Hill. Dept. of Environmental Sciences and Engineering.
Edward J. Kuenzler.
Journal of Phycology, Vol 6, No 1, p 7-13, 1970. 4 fig, 2 tab, 33 ref. AEC Contract AT- (40-1)-3549.

Descriptors: *Organic compounds, *Phosphorus, *Marine plants, *Phytoplankton, Algae, Light intensity, Salinity, Nutrient requirements, Chlorella, Growth rates, Temperature, Sea water, Phosphates, Phosphorus radioisotopes, Diatoms, Hydrogen ion concentration, Marine animals, Bacteria, Absorption, Cultures.
Identifiers: *Dissolved organic phosphorus, *Excretion, Alkaline phosphatase, Reassimilation, Green flagellate, Cyclotella cryptica, Thalassiosira fluviatilis, Dunaliella tertiolecta, Synechococcus, Rhodomonas, Coccolithus huxleyi, Autolysis, Phaeodactylum.

Experiments performed on laboratory cultures show that algae eliminate dissolved organic phosphorus (DOP) compounds under varying conditions for different species, but certain patterns emerge. The amounts of extracellular DOP produced by eight species of marine planktonic algae (axenic cultures) under various conditions of light, salinity, and nutrition were compared. After initial labeling, P-32 was measured in the fractions. Different species take different fractions of the total excreted DOP. More than 20% of total phosphorus in the system was excreted by Cyclotella cryptica, Thalassiosira fluviatilis, Dunaliella tertiolecta, and Synechococcus under one or more of the experimental conditions. Excretion of DOP was proportional to light intensity in Dunaliella, Rhodomonas, Chlorella, and Coccolithus huxleyi. Phosphorus limitation reduced DOP production by Cyclotella and Thalassiosira, nitrogen limitation reduced DOP by Phacodactylum, Dunaliella, and Rhodomonas, and lack of iron reduced DOP levels in Cyclotella cultures. Salinity affected growth, but no clear relationship to DOP excretion was evident. The DOP eliminated during growth was reassimilated by the species that produced it and by other species, but lack of alkaline phosphatase reduced the amount of DOP available to certain algae. (Jones-Wisconsin)
W71-10083

LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS,
Mississippi State Univ., State College. Dept. of Zoology.
Syed M. Naqvi, and Denzel E. Ferguson.
Transactions of the American Fisheries Society, Vol 99, No 4, p 696-699, 1970. 1 fig, 1 tab, 12 ref.

Descriptors: *Insecticides, *Resistance, *Shrimp, *Fresh water, Organophosphorus pesticides, Bioassay, Mississippi, Pesticide toxicity, Absorption, Endrin, DDT, Heptachlor, Canals, Cotton, Drainage water, Ponds, Lakes, Water pollution effects, Water pollution sources.
Identifiers: *Palaemonetes kadiakensis, Bluff Lake (Miss), Organochlorine insecticides, Methyl parathion, Carbamate insecticides, Parathion, Guthion, Sevin, Lindane, Toxaphene, Strobande, Chlordane, Sky Lake (Miss).

Invertebrates carrying high resistance levels to pesticides could be hazardous to animals in higher trophic levels. Extent and degree of resistance to 11 insecticides, including organochlorine, organophosphorus and carbamate compounds, in three populations of fresh-water shrimp from the Mississippi delta are reported. For comparison, shrimp were obtained from Noxubee National Wildlife Refuge, an area where agricultural pesticides have not been used. In 24-hour bioassays, fresh-water shrimp, Palaemonetes kadiakensis from areas of intensive pesticide use were 1 to 25 times more resistant than shrimp from the wildlife refuge. Although populations differed in amount of resistance, relative toxicity of the insecticides was similar. Toxicity of the insecticides, ranked as follows: Most toxic, endrin, DDT, methyl parathion, parathion; medium toxicity, Guthion, lindane, toxaphene, Strobane; least toxic, chlordane, Sevin, and heptachlor. The sequence of poisoning symptoms was hyperactivity, tremoring appendages, loss of equilibrium, complete paralysis, and death. Because of its high toxicity and heavy use in control of cotton insects, DDT seems to pose the greatest threat to shrimp populations. When caged in a canal near cotton fields, susceptible shrimp suffered 66% more mortality than did native, resistant shrimp. (Jones-Wisconsin)
W71-10084

RESIDUES OF DDT, DDE AND DDD IN FISH IN THE SASKATCHEWAN RIVER AFTER USING DDT AS A BLACKFLY LARVICIDE FOR TWENTY YEARS,
Canada Agricultural Research Station, Saskatoon (Saskatchewa); and Saskatchewan Dept. of Natural Resources, Saskatoon.
F. J. H. Fredeen, J. G. Saha, and L. M. Royer.
Research Station, Saskatoon, Sask, (Canada) Contribution No. 415. Journal Fisheries Research Board of Canada, Vol 28, No 1, p 105-109, 1971. 1 fig, 2 tab, 4 ref.

Descriptors: *Chlorinated hydrocarbon pesticides, *DDT, *Pesticide residues, Fish, Larvicides, Dieldrin, Water pollution effects, Water pollution sources.
Identifiers: DDE, DDD, Saskatchewan River (Canada), Blackfly larvae, Simulium arcticum.

During most of the past 20 years, Saskatchewan River (Canada) was subjected to a blackfly larvicidal program using one or two annual applications of DDT. Analyses of muscle tissues of suckers, perch, walleyes, and northern pike in 1968 disclosed that concentration of DDT, DDD, and DDE did not exceed 0.06 ppm--a concentration well below the actionable level of 5.0 ppm of DDT. The concentration of dieldrin ranged from 0.002 to 0.006 ppm. Feeding rainbow trout with DDT-C-14 treated grasshoppers and subsequent extraction of fish tissues with acetonitrile removed about 93% of residues. (Wilde-Wisconsin)
W71-10086

DEVELOPMENT OF PHYSICO-CHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS PRECEDING SUMMER STAGNATION IN A RESERVOIR (In French),
Institut National de la Recherche Agronomique, Thonon-les-Bains (France). Station d'Hydrobiologie Continentale.
J. Feuillade.
English summary. Annales d'Hydrobiologie, Vol 1, No 1, p 7-41, 1970. 2 fig, 7 tab, 10 ref, 9 diagrams.

Descriptors: *Reservoirs, *Primary productivity, *Physicochemical properties, Aquatic microbiology, Mud, Carbon, Ammonification, Analysis, Denitrification.
Identifiers: Free gaseous carbon, Summer stagnation, Vezins Reservoir, Manche (France), Dehydrogenation, Amylolytic organisms.

Physical, chemical, and microbiological characteristics of water and mud sediment were determined at four points of the Vezins Reservoir, Manche, France, during the May prestagnation period. The results indicated that the summer primary production was depressed by a deficiency of free gaseous carbon. The activity of mud organisms was greater in the upper part of the reservoir; the dehydrogenation exhibited a reversed trend in correlation with the low carbon content. Ammonifying and amylolytic organisms were more active than the denitrifiers. (Wilde-Wisconsin)
W71-10087

MERCURY POLLUTION: INTEREST IN IT NOW ON THE UPSWING,
Industrial Pollution Control, Inc., Westport. Conn.
T. W. Lesperance.

Water and Wastes Engineering, Jan 1971. 3 p, 2 tab, 8 ref.

Descriptors: *Public health, *Water pollution effects, *Human pathology, Water pollution sources, Toxicity, Standards, Regulation, Fish, Shellfish, Potable water, Safety, Soil contamination, Analytical techniques, Air pollution, Industrial wastes.
Identifiers: *Mercury, *Toxic metals, Japan, Russia, Sweden, Canada, Mercury reclamation, Mercury compounds.

A summary of recent reports on mercury pollution is presented. In view of the injurious effect of inorganic and organic mercury compounds on the liver, kidneys, and the central nervous system, both the USPHS and Russia tentatively proposed a 0.005 ppm or mg per liter level of mercury in drinking water. Acute poisoning has resulted from ingestion of 100 mg of mercuric chloride. The World Health Organization has established a standard of 0.05 mg of mercury per kg of fish as acceptable for human consumption. According to some claims, 4 to 12 mg of mercury as a soluble salt may be safely ingested daily. Neutron activation analysis, colorimetric determination with dithizone, and X-ray fluorescence are the methods that promise sufficient accuracy in detecting trace amounts of mercury in water. Removal of mercury is attempted by condensation, precipitation in the form of sulfide, and lime treatments. Tables are included of various metal concentrations critically toxic to humans and aquatic insects. (Wilde-Wisconsin)
W71-10088

THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
California Univ., Berkeley. Microbiology Group.
R. O. Poyton.
Journal of General Microbiology, Vol 62, No 2, p 171-188, 1970. 3 fig, 4 tab, 53 ref. WASA Grant (NsG (T)-117-2).

Descriptors: *Chlorella, *Plant morphology, *Plant physiology, *Cytological studies, Spores, Systematics, Marine fungi, Marine plants.
Identifiers: *Hyalochlorella marine, *Prototheca, *Counterpart, Colorless algae, Autotrophic, Growth conditions, Autospores, Nuclear division, Physiology, Coccidioides, Dermocystidium marinum.

Either isolated from nature (sea water and surface of littoral filamentous algae) as members of the genus Prototheca, or in the laboratory as spontaneous or induced mutants of various Chlorella strains, achloric counterparts to Chlorella have been reported. Study has led to conclusions that they are morphological and developmental counterparts of Chlorella, yet distinct from Prototheca, its known colourless counterpart. Prototheca and Chlorella differ in mode of nutrition, storage products, and thiamine requirements. Like Prototheca, the colourless mutants of Chlorella do not fix carbon dioxide autotrophically and do not store starch, but, unlike Prototheca, they do not require thiamine. Hyalochlorella marine gen et sp nov is described as type species of a new colourless genus of the chlorococcalean algae; it is distinguishable from Prototheca by mode of autospore discharge, possession of a large centric or eccentric vacuole, a Ruthenium Red positive wall, and lack of pectinaceous interstitial ground substance in mature sporangium. Developmental cycle is simple, involving a growth period followed by cytokinesis. Nuclear division occurs concomitantly with growth; cytokinesis involves segmentation of a multinucleate protoplast into uninucleate daughter proplasts (preautospores) by simultaneous multiple fission. (Jones-Wisconsin)
W71-10090

DISSOLVED ORGANIC COMPOUNDS AND THEIR UTILIZATION IN TWO MARL LAKES,
Michigan State Univ., Hickory Corners. W.K. Kellogg Biological Station.
Robert G. Wetzel.
Hidrologiai Kozlony, Vol 47, No 7, p 298-303, 1967. 4 fig, 2 tab, 17 ref. NSF Grant GB-1452.

Descriptors: *Productivity, *Photosynthesis, *Nutrients, *Bacteria, Metabolism, Organic matter, Absorption, Thermal stratification, Lakes, Turnovers, Marl.
Identifiers: Substrate regeneration, Dilution technique, Michaelis-Menton enzyme kinetics, Marl lakes.

Consumption of glucose, fructose, galactose, and acetate by bacteria was determined in two hard water lakes by the use of C-14 labelled compounds. Mathematical and graphical analyses of culture data permitted estimates of concentration, velocity of uptake, and turnover time of regeneration of the substrate. Algal utilization of organic matter was insignificant. During thermal stratification the levels of sugars and acetate increased in metalimnion, but glucose concentration was also increased near sediments. The vernal overturn exhibited a uniform distribution of all investigated parameters. (Wilde-Wisconsin)
W71-10091

THE FOOD SOURCES OF LAKE ZOOPLANKTON (In Polish),
Warsaw Univ. (Poland). Chair of Hydrobiology.
Zbigniew M. Gliwicz.
English summary. Ekologia Polska, Seria B, Vol 15, No 3, p 205-223, 1969, 146 ref.

Descriptors: *Zooplankton, *Foods, *Organic matter, Bacteria, Tripton, Food chains, Particle size, Rotifers, Crustaceans, Nannoplankton, Aquatic animals, Food habits, Lakes.
Identifiers: *Food sources.

This review of literature on sources of food of zooplankton organisms include dissolved organic matter, bacteria, and tripton. The indirect utilization of primary production by zooplankters proceeds according to the following chain: dissolved organic matter, largely secreted by living algae, bacteria utilizing organic suspensions, and tripton formed by dead organisms or a coagulation of dissolved organic matter. Predominant macrofiltrators largely graze nannoplanktonic algae of several microns in diameter, whereas microfiltrators and sedimentators consume small bacteria. (Wilde-Wisconsin)
W71-10094

A REVIEW OF STUDIES ON THE BOTTOM SEDIMENTS OF LAKES (In Polish),
Institute of Ecology, Warsaw (Poland).
Jan Igor Rybak.
English summary. Ekologia Polska, Seria B, Vol 15, No 1, p 19-30, 1969. 85 ref.

Descriptors: *Sediments, *Lakes, *Chemicals, Nutrients, Organic matter, Chemical properties, Oxygen, Chemical degradation, Biochemical oxygen demand, Analysis.

The more important studies pertinent to the chemical composition of lake sediments are summarized. Particular attention is given to the origin, content, and composition of organic matter, and the effect of oxygen on the processes of mineralization. The methods of analyses of oxygen consumption by the sediments are critically reviewed and the dearth of information related to processes taking place in bottom deposits is pointed out. (Wilde-Wisconsin)
W71-10095

PRIMARY PRODUCTION: DEPRESSION OF OXYGEN EVOLUTION IN ALGAL CULTURES BY ORGANOPHOSPHORUS INSECTICIDES,
Northwestern Univ., Boston, Mass. Dept. of Biology.
Sylvia B. Derby, and Ernest Ruber.
Bulletin of Environmental Contamination and Toxicology, Vol 5, No 6, p 553-557, 1971. 1 tab, 10 ref.

Descriptors: *Insecticides, *Algae, *Primary productivity, Chlorinated hydrocarbon pesticides, DDT, Organophosphorus pesticides, Phytoplankton, Toxicity, Dissolved oxygen, Cultrues, Endrin, Dieldrin, Oxygenation, Carbamate pesticides.
Identifiers: Abate, Baytex, Baygone, Cyclotella, Dunaliella, Skeletonema.

The effect of DDT, organophosphates (Baytex, Abate), and carbamate (Baygone) insecticides was appraised on the basis of oxygen produced by algae in acetone culture media. The insecticides were used in concentrations of 1.0, 0.1, and 0.01 ppm. The results varied with algal species and the nature of eradicants. The order from the most to least toxic compounds was: Baytex, Baygone, DDT, and Abate. The vulnerability of algae to insecticides increased in the following order: Cyclotella nana, Phaeodactylum tricornutum, Skeletonema costatum, and Dunaliella euchlora. (Wilde-Wisconsin)
W71-10096

EFFECTS OF ZOOPLANKTON ON PHOTOSYNTHESIS BY ALGAE IN LAKES,
Richmond Univ., Va. Dept. of Biology.
John W. Bishop.
Virginia Polytechnic Institute, Blacksburg, Virginia, Water Resources Research Center, Bulletin No 31, p 89-93, 1969. OWRR Project A-002-VA (1).

Descriptors: *Zooplankton, *Photosynthesis, *Algae, Lakes, Oxygen, Eutrophication, Algal control, Biocontrol, Turbulence, Copepods, Rotifers, Chlorophyll, Pigments, Impoundments, Reservoirs, Analytical techniques, On-site tests.
Identifiers: Asterionella spiroides, Cladocerans, Westhampton Lake (Va).

Possibility of biological control of algae in nutrient enriched waters prompted study of zooplankton as potential regulators of algae. Experiments were conducted in aquaria where assemblages of algae were confined (one in paired aquaria in the lake with and one without migratory zooplankton). Effects of the aquaria on three physical factors of lake water, light intensity, temperature, and turbulence were compared. Differences between quantities and rates of algal photosynthesis in the aquaria were used as estimates of zooplankton effect on algae. The chlorophyll method for measurement of algal concentration corrected for pheo-pigments. Rate of radioactive carbon uptake as measure of photosynthesis was studied, using a liquid scintillation counter and by the oxygen evolution method which was sufficiently accurate and easier for routine experiments. Pheo-pigments consisted of nearly 52% of the algal pigments analyzed and increased from the surface toward lake bottom; rotifers were about 60% OF ZOOPLANKTON DURING MID—SUMMER; CLADOCERANS WERE NOT MORE THAN %. Experiments to ascertain effects of aquaria and zooplankton on photosynthesis are to be continued. (See also W70-06028) (Jones-Wisconsin)
W71-10098

POLLUTION - HOW MUCH OF A PROBLEM COMES FROM FERTILIZERS,
Missouri Univ , Columbia. Water Resources Research Center.
George E. Smith.
In: 33rd Annual (Forum), National Farm Institue, February 1971, Des Moines, Iowa p. 40-48.

Descriptors: *Fertilizers, *Nitrogen, *Nitrate, Nitrite, Nutrients, Fertility, Toxicity, Eutrophication, Phosphorus, Water supply, Water walls, Runoff, Carbon dioxide, Oxygen, Photosynthesis, Water pollution, Soil contamination.
Identifiers: Metoglobenemia, Nitrate accumulation.

An objective view is given of fertilizer usage and its role as a pollutant. First concern for pollution from fertilizers was in connection with nitrate toxicity (metoglobenemia) in human infants and some spe-

cies of livestock. Most of the water involved came from improperly constructed wells near livestock or where low rainfall caused nitrate accumulation in the soil from organic matters. Chemical fertilizers as well as city sewage, livestock wastes, and plant residues are all sources of nutrients which may cause eutrophication. Nitrate may accumulate in plant tissue to undesirable levels only under certain climatic and cultural conditions. A Missouri study of water supplies indicated that most nitrate contaminated wells were (1) in rural locations, (2) shallow, (3) poorly constructed, and (4) in areas where livestock production is the main source of farm income. There was a high degree of correlation between the occurrance and the concentration of nitrate in these wells and their proximity to livestock feeding areas or to septic tank tile fields. A final note is made of the corn farmer as an ecologist, whereby an acre of corn will use 10.5 tons of CO2 while producing 2.5 tons of plant material and 8 tons of oxygen - enough to support 12 people for a year. (See also W71-09752) (White-Iowa State)
W71-10099

STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
Missouri Univ., Columbia.
Donald R. Levi, and John C. Holstein.
Science and Technology Guide, Published by the University of Missouri-Columbia Extension Division; File: Ag Econ 3 3/70, 7M. p 581-584, (Mar 1970).

Descriptors: *Legal aspects, *Regulation, Farm wastes, Missouri.
Identifiers: *Pollution laws, *Nuisance law, *Legal procedure, *Liability, Lawsuits, Stockmen.

There is no one thing a livestock operator can do and gain absolute protection under the nuisance law. Thus, it is imperative that you attempt to prevent such lawsuits from arising. This implies that those who follow a 'good neighbor' policy are less likely to be sued. Try to avoid causing your neighbors discomfort. This guide only discusses some general principles affecting the civil liability of feedlot operators under the nuisance laws. If you are faced with potential air or water pollution problem, don't hesitate to disucss it with your attorney. (Christenbury-Iowa State)
W71-10103

THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
Nottingham Univ. (England). School of Agriculture.
D. R. Charles, and C. G. Payne.
British Poultry Science, Vol 7, p 177-187, 189-198, 1966. 16 tab, 32 ref.

Descriptors: *Farm wastes, *Environmental effects, *Air pollution, *Air pollution effects, Growth, Rates, Respiration, Performance, Productivity, Ventilation, Air circulation, Poultry , Ammonia, Eggs.
Identifiers: *Ammonia toxicity, *Food consumption, Ammonia concentrations, Respiration rates, Food conversion efficiency.

A detailed description is given of studies done on the effects of air pollution on white leghorn chickens. The studies were done in two parts, one on broilers and replacement chickens and the second on laying hens. One hundred parts per million by volume of ammonia caused reductions in the respiration rates of adult hens between 7 and 24 percent. Broiler chickens from 28 days of age tended to eat less food than those reared in ammonia free atmospheres. At 100 p.p.m. of ammonia their growth rate was significantly reduced. Replacement laying pullets raised in ammonia containing atmospheres from 11-18 weeks of age had reduced food intake than those in ammonia free atmospheres. Pullets raised in atmospheres with high ammonia concentrations matured up to two weeks later than those in atmospheres free of ammonia. Atmospheres of 105 p.p.m. of ammonia significantly reduced egg production after 10 weeks exposure. No effects were observed on egg quality. Voluntary food intake was reduced and live-weight gain was lower in ammoniated atmospheres. High protein, vitamin, and mineral diet prevented the onset of any delcterious effects of ammonia on egg production, even though food consumption fell to 75 g./bird/day at 29 C., 43% humidity and 104 p.p.m. of ammonia when a low energy diet was fed to hens in high ammoniated atmospheres. Their production deteriorated rapidly. (Hazen-Iowa State)
W71-10105

MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
Washington Univ., Seattle. Lab. of Radiation Ecology.
Thomas M. Beasley.
Environmental Science and Technology, Vol 5, No 7, p 634-635, July, 1971. 1 tab, 12 ref.

Descriptors: *Heavy metals, *Public health, *Foods, Water pollution effects, Metals, Fish physiology, Absorption, Proteins, Biochemistry, Diseases, Environmental sanitation, Human diseases, Legal aspects, Poisons, Toxins, Toxicity, Water pollution.
Identifiers: *Mercury, *Fish protein concentrate, *Concentration factors, FPC, Surface feeding fish.

Assuming a 1000 accumulation factor of mercury in fish, and a farther concentration factor of 5 for the preparation of fish protein concentrates (FPC), mercury concentrations near 0.5 ppm might be expected in FPC products. Concentrates prepared from surface feeding fish taken from different locales contained 0.3-0.9 ppm of mercury. Combining estimates of present daily Hg intake with the daily intake of 10-30 g FPC implies that consumption of the products tested would not cause Hg intake levels to exceed a cited recommended total Hg intake. (LeGore - Washington)
W71-10206

PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,
Rhode Island Univ., Kingston. Narragansett Marine Lab.
Peter A. Burns, and Milton Salomon.
Contribution no. 130 of the Rhode Island Agricultural Experiment Station. Proceedings of the National Shellfisheries Association, Vol 59, p 121-125, June, 1969. 7 fig, 25 ref.

Descriptors: *Adsorption, *Kaolinite, *Phosphates, *Sediments, Clay minerals, Fertilizers, Water pollution treatment, Water pollution effects, Water pollution control, Rhode Island, Temperature, Water temperature, Salinity, Hydrogen ion concentration, Bottom sediments.
Identifiers: *Kaolin, pH.

The adsorption of dissolved inorganic phosphate on pure kaolin and on the silt-clay sediment fraction from Point Judith Pond, Rhode Island, was studied in laboratory experiments. Temperature, salinity, pH, and the phosphate to kaolin ratio were varied to determine the effects of these environmental factors on adsorption. The adsorption of phosphate onto kaolin was depressed by increased silt concentration, high pH and low temperature. In all experiments the adsorption reaction was essentially complete after 24 hr. The calculated heat of reaction from temperature dependence data indicates that fixation is associated with exchangeable hydroxyl groups on the edges of the clay crystal. Point Judith Pond sediment displayed a markedly different phosphate adsorptive capacity. This is possibly due to the clay mineral content of the sediment and to a depressant effect on the adsorption reaction by associated organic matter. (LeGore - Washington)
W71-10207

TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
Virginia Inst. of Marine Science, Gloucester Point.
For primary bibliographic entry see Field 05B.
W71-10208

TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
Public Health Service, Washington, D.C. Consumer Protection and Environmental Health Service.
Carl N. Schuster, and Benjamin H. Pringle.
Contribution No. 30 from the Northeast Marine Health Sciences Lab, Narragansett, Rhode Island. Proceedings of the National Shellfisheries Association, Vol 59, p 91-103, June 1969. 4 fig, 7 tab, 15 ref.

Descriptors: *Oysters, *Absorption, *Metals, *Heavy metals, *Copper, *Chromium, *Pollutants, Environmental effects, Water pollution effects, Animal pathology, Commercial shellfish, Chemical wastes, Poisons, Toxins, Water pollution, Physiological ecology, Mollusks, Shellfish, Pathology, Trace elements.
Identifiers: *Cadmium, *Zinc, Bioaccumulation, Invertebrate pathology, Accumulation.

A 20-week study was conducted early in 1968 to corroborate an earlier experiment on uptake by Crassostrea virginica. About 200 November-harvested oysters were maintained in a flow-through seawater system. Beginning in January, the oysters were subjected to continuous levels of the nitrate salts of zinc, copper, cadmium and chromium. Each week oysters were removed for analysis. Information was obtained on trace metal accumulation rates, on mortalities, shell growth and on the general appearance of the oysters. The most obvious effects were observed in the copper and the cadmium exposed oysters. The bodies of the oysters exposed to copper became bluish-green in color and their shells showed excellent growth, mantle edge pigmentation increased in mortalities were slightly higher than in the controls. Cadmium exposed specimens were emaciated, showed very little shell growth, lost pigmentation of the mantle edge and coloration of the digestive diverticula and suffered high mortalities. (LeGore - Washington)
W71-10209

AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE AGENTS,
Natural Environment Research Council, Aberdeen (Scotland). Fisheries Biochemical Research Unit.
A. M. Mackie.
Journal of Experimental Marine Biology and Ecology, Vol 5, No 1, p 63-69, 1970. 4 tab, 21 ref.

Descriptors: *Detergents, *Surfactants, *Mollusks, *Snails, *Animal behavior, Animal physiology, Water pollution effects, Invertebrates, Chemcontrol, Chemicals, Chemical wastes, Environmental effects.
Identifiers: *Scallops, *Avoidance, Starfish, Marthasterias sp., Buccinum sp., Chlamys sp., Pecten sp., Ophiothrix sp., Patella sp., Non-ionic surfactants.

The substance present in extracts of Marthasterias glacialis which induces avoidance reactions in Buccinum undatum, Chlamys opercularis, Pecten maximus, Ophiothrix fragilis, and Patella vulgata has been shown to be a steroid glycoside with surface-active properties. Such reactions may also be obtained with equally low amounts of synthetic non-ionic surface-active agents. Maintenance of Buccinum undatum in a sub-lethal concentration of one of these non-ionic surfactants caused damage or fatigue to chermoreceptor cells on the surface of the foot. The possible significance of these results to pollution studies is discussed. (LeGore - Washington)
W71-10211

CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER FLOUNDER, PSEUDOPLEURONECTES AMERICANUS, FROM THE WEWEANTIC RIVER ESTUARY, MASSACHUSETTS,
Massachusetts Univ., Amherst. Dept. of Forestry and Wildlife Management.
Roderick M. Smith, and Charles F. Cole.
Mass. Coop. Fish. Unit Contribution No. 14. Journal of the Fisheries Research Board of Canada, Vol 27, No 12, p 2374-2380, 1970. 2 tab, 12 ref. OWRR Project A-002-MASS (3).

Descriptors: *DDT, *Heptachlor, *Dieldrin, *Pesticide kinetics, *Pesticide residues, *Absorption, Pesticide drift, Distribution patterns, Path of pollutants, Water pollution effects, Water pollution sources, Physiological ecology, Bioindicators, Agricultural chemicals, Pesticides, Fish physiology, Bottom fish, Marine fish, Aquatic environment, Environmental effects, Pollutants, Massachusetts.
Identifiers: *DDE, *Heptachlor epoxide, Pseudopleuronectes sp., Flounder, Flatfishes.

Residues of DDT, heptachlor and dieldrin were found in tissues of winter flounder, Pseudopleuronectes americanus, from the Weweantic River estuary, Massachusetts during 1966-67. In nonmigratory juveniles, seasonal accumulation patterns were demonstrated for DDT, heptachlor, and two related breakdown products, DDE and heptachlor epoxide. Peak concentrations of the parent compounds were more closely associated with high runoff conditions than any specific application in the estuarine drainage. Dieldrin was present uniformly throughout the year. Migratory adult flounder, present only between October and May, contained heptachlor and heptachlor epoxide levels similar to juveniles, but significantly less DDE. Adult female flounder sequentially concentrated DDT, DDE and heptachlor epoxide in their ripening ovaries as the spawning season approached. (LeGore - Washington)
W71-10212

COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I: BIOLOGICAL EFFECTS STUDIES.
Environmental Protection Agency, Washington, D.C.; and Atomic Energy Commission, Washington, D.C.; and National Marine Fisheries Services, Washington, D.C.

102 p. Jan, 1971. 8 tab, 74 ref.

Descriptors: *Water temperature, *Thermal pollution, *Water pollution effects, *Pollution abatement, *Physiological ecology, *Environmental effects, *Standards, *Regulation, *Columbia River, *Salmonids, *Fish food organisms, Water pollution sources, Water pollution control, Water quality, Control, Diseases, Fish diseases, Aquatic environment, Spawning, Migration patterns, Fish behavior, Fish physiology, Smelts, Heated water, Temperature, Pollutants.
Identifiers: *Spawning areas, *Migration routes, *Nursery areas, *Rearing areas, Gas bubble disease.

Data were collected for the implementation of the Federal Water Pollution Control Act, as amended by the Federal Water Quality Act of 1965, which required the establishment of water quality standards throughout the United States. On the basis of this study and the examination of literature, various permissible temperature ranges were recommended for salmonid migration routes (7.2-15.6 C), for spawning areas (7.2-12.8 C) and for rearing areas (10.0-15.6 C). Hazards of too high temperatures include increased frequency of disease, accentuated effect of gas bubble disease where this is already a problem, and direct lethality via metabolic effect. Relative to juvenile salmonids, it was concluded that the effect of rapid temperature increase is directly proportional to duration of exposure. (LeGore - Washington)
W71-10213

THE SANTA BARBARA OIL SPILL,
For primary bibliographic entry see Field 05G.
W71-10266

METAL TOXICITY TO SEWAGE ORGANISMS,
Rhode Island Univ., Kingston. Dept. of Civil and Environmental Engi neering.
Calvin P. C. Poon, and Kiran H. Bhayani.
ASCE Proceedings, Journal of the Sanitary Engineering Division, Vol 97, No SA2, Paper 8020, p 161-169, April 1971. 9 p, 2 fig, 1 tab, 5 ref, append. OWRR Project A-033-RI (1).

Descriptors: *Activated sludge, *Heavy metals, *Toxicity, *Sewage bacteria, *Sewage treatment, Sludge, Industrial wastes, Sanitary engineering.
Identifiers: *Heavy metal toxicity, *Sewage organisms.

The Michaelis-Menten model of enzyme inhibition is a convenient method to measure toxicity and to give insights to toxic behavior in pure culture and simple substrate conditions. A linear noncompetitive inhibition pattern is demonstrated for sewage bacteria, and a linear competitive inhibition pattern for sewage fungus Geotrichum candidum. Silver and nickel and more toxic to sewage bacteria than to Geotrichum candidum and therefore the metal toxicity is believed to be connected with the overgrowth of the fungus in activated sludge processes. (Knapp-USGS)
W71-10313

EFFECTS OF MANURE APPLICATIONS AND MITE PREDATION ON CORN ROOTWORM POPULATIONS IN MINNESOTA,
Minnesota Univ., St. Paul. Dept. of Entomology, Fisheries and Wildlife.
H. C. Chiang.
Journal of Economic Entomology, Vol 64, No 3, June 1970, p 934-936. 3 tab, 4 ref.

Descriptors: *Mites, *Disposal, *Predation, Farm wastes, Laboratory tests, Soil treatment, Soil analysis, Soil tests, Population, Corn (Field), Distribution patterns, Water pollution effects.
Identifiers: *Corn rootworms, *Predaceous mites, Manure application, Soil test plots.

Manure was applied in corn plots in 1967 at the rate of 50 tons per acre. The northern and western corn rootworms, Diabrotica longicornia (Say), and D. virgifera LeConte, populations in these plots were reduced to about half the level of those in the check plots. Quantitative observations of the predaceous arthropods in the manured and the check plots showed that the total populations of ground beetles and spiders were not changed because of the manure application. However, the populations of mites, both predaceous and nonpredaceous, were 3 or more times as high in the manured as in the check plots. On the basis of the vertical distribution of these mites and of corn rootworms, it was concluded that the predaceous mites could be feeding on corn rootworms. The data suggested that predation by mites accounted for a 19.7% control of corn rootworms under natural field conditions and a 63.0% control when manure was applied in the field. (Hazen-Iowa State)
W71-10359

REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
Kansas State Dept. of Health, Topeka. Environmental Health Services.
For primary bibliographic entry see Field 05G.
W71-10369

EFFECT OF AGRICULTURE ON WATER QUALITY,
Federal Water Pollution Control Administration, Evansville, Ind. Lower Ohio Basin Office.
For primary bibliographic entry see Field 05G.
W71-10376

5D. Waste Treatment Processes

NITRATE AND WATER SUPPLY: SOURCE AND CONTROL.
Illinois Univ., Urbana. Dept. of Sanitary Engineering.
For primary bibliographic entry see Field 05B.
W71-09952

CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
Cornell Univ., Ithaca, N.Y. Dept. of Civil and Agricultural Engineering.
For primary bibliographic entry see Field 05B.
W71-09960

TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
Bureau of Water Hygiene, Cincinnati, Ohio.
For primary bibliographic entry see Field 05B.
W71-09961

MERCURY POLLUTION: INTEREST IN IT NOW ON THE UPSWING,
Industrial Pollution Control, Inc., Westport. Conn.
For primary bibliographic entry see Field 05C.
W71-10088

CAGE AND KENNEL WASTE WATER,
National Institutes of Health, Bethesda, Md. Div of Research Services.
For primary bibliographic entry see Field 05A.
W71-10100

POLLUTION POTENTIAL OF LIVESTOCK FEEDING OPERATIONS IN SOUTH DAKOTA,
South Dakota State Univ., Brookings. Dept. of Civil Engineering.
James N. Dronbush.
Sponsored by the SDSU College of Agriculture and Biological Sciences, and the College of Engineering. Proceedings South Dakota Agriculture and Water Quality - A Symposium on Water Pollution, 1970, p 37-46, 4 tab, 3 fig.

Descriptors: *South Dakota, *Runoff, *Pollutants, Farm wastes, Lagoons, Cost sharing, Locating, Cattle.
Identifiers: *Pollution potential, *Population equivalents, Feedlots.

The overall pollution problem for livestock feeding operations may not be as critical in South Dakota as has been assumed. Certain climatic factors appear favorable, nevertheless, feedlots poorly locited with excessive drainage may be expected to cause problems especially to lakes. General prinicples are available as guide lines for construction to control pollution and cost sharing is available. Although research can be expected to provide greater related knowledge, there appears to be little excuse for delaying the program of active feedlot pollution control particularly with all planned new construction for expansion of the feeding industry. (Christenbury-Iowa State)
W71-10104

LABORATORY STUDIES OF AEROBIC STABILIZATION OF SWINE WASTE,
Minnesota Dept. of Health, Glenwood; Illinois Univ., Urbana. Dept. of Agricultural Engineering.
R. L. Irgens, and D. L. Day.
Journal of Agricultural Engineering Research Vol 11, No 1, p 1-10, 1966. 6 fig, 7 tab, 11 ref.

Descriptors: *Farmwastes, *Swine, Aerobic treatment, Waste disposal, Chlorination, Waste treatment, Oxygenation, Oxidation lagoons.
Identifiers: Aerobic stabilization, Swine waste treatment, Aeration of wastes.

Pig waste was allowed to accumulate in a pit beneath a slattered floor swine finishing building

for one week or one month. Samples of this waste were brought to the laboratory for analysis and aerobic stabilization. It was concluded that adding raw waste continusouly to the aeration unit gave the best results. The treated effluent had a BOD of 10 to 15 p.p.m. and contained only a trace of ammonia. Treatment by the aerobic process made the swine waste virtually odorless and stable. About 6 ft. 3 of liquid was required to dilute the waste from 150 lb. pig at the beginning of the aerobic process and 2500 ft. 3 of air was needed per pound of BOD. However, the more efficient oxygenation obtained with an aeration rotor in an oxidation ditch might reduce the latter value considerably. It was estimated that 36 KWh might be required per pig per year for operation of the aeration rotor of an oxidation ditch chlorination of diluted swine waste eliminated a certain degree of odor and improved flocculation and dewatering of the solids. The COD of the chlorinated and filtered waste was reduced 72%. Chlorinated compounds of various types may have similar effects. (Hazen-Iowa State)
W71-10106

WATER RECLAMATION.
For primary bibliographic entry see Field 06E.
W71-10127

PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,
Rhode Island Univ., Kingston. Narragansett Marine Lab.
For primary bibliographic entry see Field 05C.
W71-10207

FEDERAL ASSISTANCE FOR TREATMENT FACILITIES.
For primary bibliographic entry see Field 06E.
W71-10216

WATER POLLUTION CONTROL FACILITIES - FINANCING.
For primary bibliographic entry see Field 06E.
W71-10224

WASTE TREATMENT FACILITIES.
For primary bibliographic entry see Field 06E.
W71-10239

INSTALLATION AND OPERATION OF SEPTIC TANK SEWAGE DISPOSAL SYSTEMS,
Delaware Water and Air Resources Commission, Dover.

Water Pollution Control Reg No 2, 1968, 24 p, 1 tab.

Descriptors: *Delaware, *Septic tanks, *Sewage treatment, *Regulation, Sewage, Domestic wastes, Sewage, Disposal, Treatment, Waste treatment, Water pollution, Waste water disposal, Administrative agencies, Inspection, Permits, Standards, Water quality control, Water pollution control, Public health, Administration, State government.

This regulation establishes the minimum requirements of the Water and Air Resources Commission governing septic tank disposal systems for individual homes, apartment houses, condominiums, subdivisions, mobile home parks, business establishments, and public and private institutions throughout the state, where approved sewerage systems are not available. The regulation applies to all new septic tank sewage disposal systems and replacements and additions to existing systems after the regulations' effective date. The Commission has control over enforcement of the regulation and all licensing thereunder, as well as authority to change the minimum requirements as necessary. The regulation sets forth detailed specifications concerning septic tank location, construction, and usage. Specifications are also established concerning closing tanks, distribution boxes, tile fields, seepage pits, and rules governing soil characteristics for septic tank sewage disposal systems. Detailed conditions are also prescribed for house sewers, subdivisions and mobile home parks, as well as scavanger permits. (Horwitz-Florida)
W71-10256

TREATMENT REQUIREMENTS.
Pennsylvania Sanitary Water Board, Harrisburg.
For primary bibliographic entry see Field 06E.
W71-10276

CERTIFICATION OF POLLUTION CONTROL FACILITIES FOR TAX RELIEF.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 06E.
W71-10283

PLANT OPERATION (WASTE TREATMENT DISPOSAL REQUIREMENTS).
Oregon Dept. of Environmental Quality, Salem.
For primary bibliographic entry see Field 06E.
W71-10300

A1A MOBILE HOME PARK, INC V BREVARD COUNTY (INJUNCTION TO PREVENT CONSTRUCTION AND OPERATION OF SEWAGE TREATMENT PLANT).
For primary bibliographic entry see Field 06E.
W71-10302

METAL TOXICITY TO SEWAGE ORGANISMS,
Rhode Island Univ., Kingston. Dept. of Civil and Environmental Engi neering.
For primary bibliographic entry see Field 05C.
W71-10313

THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
Pennsylvania State Univ., College Park. Agricultural Experiment Station.
Charles A. McClurg, Ernest L. Bergman, and Glenn O. Bressler.
Progress Report 312, April 1971, 9 p, 12 tab., 18 ref.

Descriptors: *Poultry, *Crop response, Farm wastes, *Waste treatment, Fertilizers, Soil analysis, Laboratory tests, Sampling.
Identifiers: *Ashed poultry manure, Waste reuse.

Four experiments were conducted to determine the growth of snap beans (phaseolus vulgaris L.) and tomatoes (lycoperscon esculentum mill) in a Hagerstown clay loam soil containing various proportions of ground dried and/or ashed poultry manure. Addition of ash significantly increased soil pH, available P, and milliequivalents and percent saturation of K, Mg, Ca in the soil. Germination of bean seed in pot culture was severely restricted by the amounts of ash and/or dried manure added to the soil due to excessive concentrations of soluble salts, however, pod yield increased with low levels of ash and dried manure. Leaf analyses indicated increased K and Mg and decreased Ca content when ash had been added to the soil. Addition of dried manure resulted in increased foliar content of P, K, Ca, Mg, Mn, Fe, and Al. There was no significant reduction of stand or yield when snap beans were grown under field conditions on soil to which 30t/acre ash had been added although maturity of pods appeared to be slightly delayed. Foliar analysis of beans grown in soil treated with ash showed significant increases of K, Mg, B, Na in leaves, while Ca and Mn decreased significantly. Application of ash to field soils at a rate of 120t/acre resulted in the death of all tomato transplants and no weed growth. With 60t/acre a 45 percent morality and consequent reduction of yield were observed. Ashed poultry manure can definitely be used in crop production but only in conjunction with a soil test. (Hazen-Iowa State)
W71-10355

EFFECT OF MANURE APPLICATION, AERATION, AND SOIL pH ON SOIL NITROGEN TRANSFORMATIONS AND ON CERTAIN SOIL TEST VALUES,
Wisconsin Univ., Madison. Dept. of Soils.
R. J. Olsen, R. F. Hensler, and O. J. Attoe.
Soil Science Society of America Proceedings, Vol 34, 1970, p 222-225, 2 fig, 2 tab, 10 ref.

Descriptors: *Nitrification, Denitrification, *Aerobic conditions, Aeration, Soil water, Waste water treatment, Water pollution effects.
Identifiers: N Recovery, Field moisture capacity, Soil pH.

Nitrate production under aerobic conditions was directly related to rate of manure application, period of incubation, and soil pH but was stopped under anaerobic conditions. Average recovery by chemical analysis of N applied as manure to a plain field at relatively high rates and incubated for 37 weeks was 77% for aerobic conditions and 24% for anaerobic conditions. The addition of manure tended to increase soil pH and the contents of organic N, available P and exchangeable K, Ca and Mg, particularly at the higher rates. They also increased the field moisture capacity of a plain field sand. However, on an acid ella loamy sand values for field moisture capacity, apparently the result of formation of a waxy material that tended to repel water absorption. (Hazen-Iowa State)
W71-10357

VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
Pennsylvania State Univ., University Park.
F. F. El-Sabban, J. W. Bratzler, T. A. Long, D. E. H. Frear, and R. F. Gentry.
Journal of Animals Science, Vol 31, 1970, p 107-111. 5 tab, 16 ref.

Descriptors: *Ruminants, *Poultry, *Digestion, *Diets, Farm wastes, *Waste treatment, Nitrogen, Animal metabolism, Livestock, Laboratory tests.
Identifiers: Waste processing, Waste utilization, Heat treated poultry waste.

Heat treated poultry waste was evaluated as a source of nitrogen for ruminant animals. Poultry waste was subjected to three different heat treatments to produce autoclaved (APW), cooked (CPW), and dried (DPW) products. In a sheep metabolism trial, wethers were fed semi-purified rations in which nitrogen was supplied by APW, CPW, or Soybean meal. Digestibility coefficients for dry matter and energy were not significantly different among rations, but that of protein was significantly higher for the ration containing soybean meal (control) than of the ration containing APW. Urinary energy was significantly higher for the control ration than for the rations containing APW or CPW. Fecal nitrogen was significantly lower for the control ration than for the rations containing poultry waste products, no other significant differences were found. Twenty-five angus steers, divided into four groups, were used in a 134-day feeding trial, steers were fed finishing rations in which all supplemental nitrogen was provided by soybean meal, APW, DPW, or urea. Rate of gain and feed rations in which supplemental protein was provided by soybean meal, APW or DPW. Rate of gain was significantly higher for steers fed a ration containing urea than those fed the ration containing DPW. Carcass characteristics and meat acceptability were not significantly different among steers fed the different rations. Chlorinated hydrocarbon compounds in backfat and liver arsenic were found in amounts less than 1 PPM. (Hazen-Iowa State)
W71-10358

ANIMAL WASTE DISPOSAL BECOMES A MORE DIFFICULT PROBLEM,
Illinois Univ., Urbana. Dairy Science.
S. L. Spahr.
Illinois Research, Vol 12, No 4, p 4-5, Fall 1970.

Descriptors: *Disposal, *Odor, Farm wastes, Runoff, Illinois, Equipment, Farm lagoons, Gases, Water pollution control, Storage pits, Waste treatment.
Identifiers: Feedlot runoff, Oxidation ditch, Pollution potential, Uses, Research needs.

Many of the current systems of animal waste disposal may create serious health and pollution problems. Little knowledge is available to solve many of the problems facing the livestock producers. Current technology and future research needs for waste disposal are discussed. (Christenbury-Iowa State)
W71-10362

TURNING WASTES INTO PROFITS,
Earl D. Anderson.
Farm Quarterly, Vol 25, No 6, Nov-Dec 1970, p 48-85. 1 fig.

Descriptors: *Waste treatment, *Drying, Poultry, Odor, Waste storage.
Identifiers: Waste drying pit, Odor control, *Waste reuse.

The manure drying pit is a new concept in on-farm conversion of wastes to salable products. In the pit, circulating fans subject droppings to a continuous flow of drying air at an average velocity of 500 feet per minute. Also, the accumulated droppings are stirred and exposed to the drying air by a winch-drawn spike-toot- harrow. Periodically, the droppings are removed by means of a hinged cleanout board attached to the harrow. The partically dried manure can be stored indefinitely without developing an odor and without taking up moisture from the surrounding air. Controlling odors in the house provides a better environment for the birds and the attendants. (Hazen-Iowa State)
W71-10363

DISPOSAL OF HATCHERY WASTES,
Harrold's Hatchery, Inc., Winterville, Ga.
Tom Harrold.
Poultry Digest, Vol. 30 (351), May 1971, p 250-251.

Descriptors: *Waste disposal, *Poultry, *Waste treatment, Incineration, Temperature, Disposal.
Identifiers: *Hatchery waste disposal.

A description is given in this text of a method of waste disposal which reduces waste to 5% of the original and produces a product desired by gardeners. This method is incineration. Five design criteria are given in considering incinerators for use in disposal of hatchery wastes. They are (1) burning area; (2) operating temperature; (3) temperature control; (4) refractory materials; (5) stack. Maintenance of an incinerator is minimal and the incinerator produces no odor and no smoke. The powdery ash, composed mainly of calcium and magnesium, produced is in demand by gardeners. (Hazen-Iowa State)
W71-10364

RECYCLED POULTRY NUTRIENTS,
Michigan State Univ., East Lansing. Dept. of Poultry Science.
Howard C. Zindel.
Poultry Digest, Vol 30 (351), May 1971, p 231-233. 2 tab.

Descriptors: *Cycling nutrients, Farm wastes, Poultry, *Waste treatment, Waste disposal, Diets.
Identifiers: *Dried poultry waste, Recycled nutrients.

The text gives results of tests in which dehydrated poultry manure was incorporated into livestock feed. The feed was given to white leghorn chickens, beef cattle, sheep, dairy cattle, young calves, and goats. Tests on turkeys are just getting started. Three tests on chickens given control rations, 25% DPW (dehydrated poultry waste), and 12.5% DPW, gave the following results in production: 74.5%, 71.9%, 71.0% respectively. The conclusion is that the problem of smelly waste is eliminated, a valuable ingredient is gained which releases corn and corn protein for other world uses, the cost per dozen eggs or pound of gain is reduced, and an easy-to-handle fertilizer product (5-3-1), organic in nature and readily usable is obtained. (Hazen-Iowa State)
W71-10365

2ND COMPENDIUM OF ANIMAL WASTE MANAGEMENT.
Federal Water Pollution Control Administration, Kansas City, Mo. Missouri Basin Region.
For primary bibliographic entry see Field 05G.
W71-10366

5E. Ultimate Disposal of Wastes

THE MOUNTING PROBLEM OF CATTLE FEEDLOT POLLUTION,
For primary bibliographic entry see Field 05G.
W71-10111

SOLID WASTE DISPOSAL STANDARDS.
Wisconsin Natural Resources Board, Madison.
For primary bibliographic entry see Field 05G.
W71-10114

TRANSPORTATION AND DISPOSAL OF WASTE.
For primary bibliographic entry see Field 06E.
W71-10131

DISPOSAL OF OIL WASTES.
For primary bibliographic entry see Field 06E.
W71-10142

DISPOSAL OF OIL WASTES.
For primary bibliographic entry see Field 06E.
W71-10143

SOLID WASTE DISPOSAL ACT.
For primary bibliographic entry see Field 06E.
W71-10228

INJECTION WELL ACT.
For primary bibliographic entry see Field 06E.
W71-10229

DISPOSAL OF HATCHERY WASTES,
Harrold's Hatchery, Inc., Winterville, Ga.
For primary bibliographic entry see Field 05D.
W71-10364

MANAGEMENT OF ANIMAL FEEDLOT WASTES -- LAND SPREADING AS A DISPOSAL PROCESS,
Missouri Univ., Columbia. Water Resources Research Center.
For primary bibliographic entry see Field 05G.
W71-10370

DISPOSAL OF BRINES AND MINERALIZED WATERS.
For primary bibliographic entry see Field 06E.
W71-10441

5F. Water Treatment and Quality Alteration

URBAN SOURCES OF NITRATES,
Bureau of Water Hygiene, Cincinnati, Ohio.
For primary bibliographic entry see Field 05B.
W71-09959

TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
Bureau of Water Hygiene, Cincinnati, Ohio.
For primary bibliographic entry see Field 05B.
W71-09961

SEAWATER DESALTING WITH CHEMICAL RECOVERY.
Burns and Roe, Inc., Oradell, N.J. and Dow Chemical Co., Midland, Mich.
For primary bibliographic entry see Field 03A.
W71-09975

PUBLIC HEALTH--POLLUTION OF WATER SUPPLY PROSCRIBED.
For primary bibliographic entry see Field 06E.
W71-10074

PROTECTION OF WATER SUPPLY GENERALLY.
For primary bibliographic entry see Field 06E.
W71-10146

PROTECTION OF MUNICIPAL WATER SUPPLY.
For primary bibliographic entry see Field 06E.
W71-10147

STATE BOARD OF HEALTH.
For primary bibliographic entry see Field 06E.
W71-10233

POWERS AND DUTIES OF BOARD OF HEALTH--SANITARY STANDARDS FOR PROTECTION OF WATER RESOURCES.
For primary bibliographic entry see Field 06E.
W71-10249

FURNISHING POTABLE WATER.
For primary bibliographic entry see Field 06E.
W71-10435

MINIMUM STANDARDS OF SANITATION AND HEALTH PROTECTION MEASURES.
For primary bibliographic entry see Field 06E.
W71-10437

HEALTH MENACES.
For primary bibliographic entry see Field 06E.
W71-10447

5G. Water Quality Control

WELL REGULATIONS AND POLLUTION ABATEMENT.
For primary bibliographic entry see Field 06E.
W71-09933

PLACER MINING WATER POLLUTION,
For primary bibliographic entry see Field 06E.
W71-09934

GRANTS FOR WATER POLLUTION CONTROL.
For primary bibliographic entry see Field 06E.
W71-09939

EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
Battelle, Memorial Inst., Columbus, Ohio. Columbus Labs.
For primary bibliographic entry see Field 06B.
W71-09940

NITRATE AND WATER SUPPLY: SOURCE AND CONTROL.
Illinois Univ., Urbana. Dept. of Sanitary Engineering.
For primary bibliographic entry see Field 05B.
W71-09952

EXISTING LEVELS OF NITRATES IN WATER - THE CALIFORNIA SITUATION,
California State Dept. of Public Health, Berkeley.
For primary bibliographic entry see Field 05B.
W71-09955

DOMESTIC WATER AND ICE.
For primary bibliographic entry see Field 06E.
W71-09979

POLLUTION OF IRRIGATION WORKS, WATER SUPPLIES, AND WATER COURSES.
For primary bibliographic entry see Field 06E.
W71-09983

CREATION OF THE STATE BOARD OF HEALTH.
For primary bibliographic entry see Field 06E.
W71-09988

COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
Missouri Univ., Columbia. Dept. of Zoology.
For primary bibliographic entry see Field 05C.
W71-09990

WATER QUALITY MODELING OF ESTUARIES,
Water Resources Engineers, Inc., Walnut Creek, Calif.
Gerald T. Orlob, and Robert P. Shubinski.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 342-353, 1970. 12 p, 5 fig, 3 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Estuaries, *Water quality, *Mathematical models, *Water pollution sources, Oxygen demand, California, Path of pollutants, Dynamic programming, Deltas, Tidal effects, Mixing, Water balance, Nutrients, Saline water intrusion.
Identifiers: *San Francisco Bay.

A set of mathematical models which simulate the hydrodynamic and water quality behavior of a variety of estuaries is presented. The general approach consists of discretizing both embayments and delta areas as a network of elements for which numerical solutions to the equations of continuity, motion, mass transport and dispersion are obtained. Three separate models are discussed: the Tidal Hydrodynamics Model, which produces the time-varying flows and heads throughtout the estuary as it responds to tidal action, unsteady inflows, evaporation, and wind; the Dynamic Water Quality Model, which simulates the distribution and movement of pollutants, both conservative and nonconservative, as they vary tidally and on a long term basis; and the Steady State Water Quality Model, a simplified model which uses the dispersion concept to reduce the dynamic tidal problem to one steady state and mean values of flow and head. Specific applications to the San Francisco Bay-Delta are shown giving particular emphasis to the control of sea-water intrusion in the Delta and to assimilation of wastes in that region. Brief treatment is given to studies of two other estuaries. (Knapp-USGS)
W71-10047

WATER POLLUTION CONTROL ACT.
For primary bibliographic entry see Field 06E.
W71-10068

WATER POLLUTION--PROTECTION FROM.
For primary bibliographic entry see Field 06E.
W71-10071

CONSERVATION COMMITTEE TO PREVENT POLLUTION OF WATERS BY OIL INDUSTRY.
For primary bibliographic entry see Field 06E.
W71-10073

PUBLIC HEALTH--POLLUTION OF WATER SUPPLY PROSCRIBED.
For primary bibliographic entry see Field 06E.
W71-10074

NUISANCE (WATER POLLUTION).
For primary bibliographic entry see Field 06E.
W71-10078

POLLUTION OF AQUATIC HABITATS.
For primary bibliographic entry see Field 06E.
W71-10081

DISCHARGES INTO CERTAIN WATERS.
For primary bibliographic entry see Field 06E.
W71-10085

CORPORATIONS TO STORE SALT WATER,
For primary bibliographic entry see Field 06E.
W71-10097

THE MOUNTING PROBLEM OF CATTLE FEEDLOT POLLUTION,
Frank G. Viets, Jr.
Agricultural Science Review, Vol 9, No 1, First Quarter 1971, p 1-8. 2 figs, 2 tab, 13 ref.

Descriptors: *Waste disposal, *Waste dumps, Farm wastes, Solid wastes, Air pollution, Runoff, Water pollution control.
Identifiers: *Feedlot pollution, Solid waste disposal, Soil pollution.

Steadily increasing demands for well-finished beef and the apparent profitability of large integrated feeding and slaughtering operations indicate that feed lots will grow larger and not smaller. Cattle feeding is moving from a small farm enterprise toward an agricultural industry. This results in a large concentration of wastes on a small area. Most large operators are making an effort to comply with water and air pollution regulations. Because stream and lake pollution from runoff is now prohibited, engineers are challenged to design facilities that minimize runoff or dispose of it economically and, hopefully, beneficially. Runoff control is much more difficult in humid climates than in drier ones. Underground water pollution appears to be mostly a local phenomenon. Most of the unsolved problems lie in the air pollution area. Offensive odor and their control still await thorough application of microbiological and chemical research. Manure can be disposed of and used as a resource if only a small portion of the land needed to produce the feed is available for manure disposal. Zoning appears to be one of the best solutions to the feedlot problem. (Hazen-Iowa State)
W71-10111

POLLUTION OF THE HIGH SEAS RESULTING FROM DRILLING AND PRODUCING OPERATIONS--FEDERAL JURISDICTION AND OPERATOR LIABILITY,
Andrew F. Walch.
South Texas Law Journal, Vol 12, No 1, p 73-91, 1970. 19 p, 2 fig, 141 ref.

Descriptors: *Law of the sea, *Oil, *Natural gas, *Water pollution control, International law, International commissions, Legislation, Oceans, Continental shelf, Continental slope, Leases, Marine geology, Damages, Administrative agencies, Federal government, Federal jurisdiction, Drilling, Exploitation, Exploration, Natural resources, Pollution abatement, Water pollution, Pollutants, Legal aspects.

An evaluation is presented of the legal aspects of pollution of the high seas resulting from oil drilling and producing activities on the continental shelf, jurisdiction of the federal government, and the liability faced by offshore oil polluters. The offshore domain is explained and discussed. Federal legislation, regulation, lease forms, and international legislation adopted by the United Nations Conference on the Law of the Sea are also examined. The sources of United States jurisdiction are as follows: (1) submerged lands cases, (2) the Submerged Lands Act of 1953, (3) the Outer Continental Shelf Lands Act of 1953, (4) oil and gas leases of submerged lands, (5) regulations pertaining to mineral leasing of the outer continental shelf, (6) the Convention on the Territorial Sea and the Contiguous Zone, (7) the Convention on the High Seas, and (8) the Convention on the Continental Shelf. Under the regulations and lease forms of the federal government the leasee is liable for the control and total removal of all pollution proximately resulting from his drilling or produccon operations which are likely to harm aquatic life, wildlife, or public or private property. (Robinson-Florida)
W71-10112

MISSOURI RIVER BASIN WATER QUALITY STANDARDS.
Missouri Water Pollution Board, Jefferson City.

1968. 54 p, 9 fig, 5 tab, 3 append.

Descriptors: *Missouri, *Missouri River, *Water pollution control, *Water quality control, Water law, Legal aspects, Regulation, Administration, Administrative agencies, Water pollution, Water quality, Pollution abatement, Environmental sanitation, Water policy, Permits, Water resources, Water supply, Water sources, Water utilization, River basins, River regulation, Rivers.

The present and future uses of the Missouri River are presented in chart form. General and specific water quality criteria are explained, and water quality standards for the Missouri River are listed. The waters of the Missouri River are lower in quality than is required by the standards adopted by the Missouri Water Pollution Board, and the reasons are stated herein. Maps are provided to identify the various rivers and river basins of Missouri. A chart of discharged effluents is provided which includes the location of such discharges, waste treatment provided, sewered population, waste treatment problems, and needed improvements. Other programs to control water pollution are also specified. A time schedule is provided for compliance with the water quality criteria. The statutory authority of the Board is set forth. This publication outlines the Missouri Stream Survey and Water Quality Surveillance Program. Procedures are given for notification of spills and accidental discharges affecting waters of the state. A plan for implementation and enforcement of water quality standards is also given. (Robinson-Florida)
W71-10113

SOLID WASTE DISPOSAL STANDARDS.
Wisconsin Natural Resources Board, Madison.

Wisconsin Dept of Natural Resources, Madison, Wis, 1969. 21 p.

Descriptors: *Wisconsin, *Waste disposal, *Environmental sanitation, *Standards, Regulation, Permits, Legal aspects, Administration, Water law, Governments, Planning, Water pollution control, Inspection, Water pollution sources, Solid wastes, Ultimate disposal, Landfills, Incineration, Waste dumps, Navigable waters.

This chapter governs the storage, collection, transportation, treatment, utilization, processing, and final disposition of solid waste by any person or mu-

nicipality. Definitions are given for applicable words such as solid waste, garbage, and sanitary landfill. The Department of Natural Resources is responsible for enforcement of this chapter. Solid waste disposal operations are excluded from certain areas unless the department otherwise permits. These areas include: (1) within 1,000 feet of any navigable lake, pond, or flowage; (2) within 300 feet of a navigable river or stream or to the landward side of the flood plain, whichever distance is greater, when in an unincorporated municipality; (3) within the flood plain of any watercourse within a city or village; (4) within an area from which solid waste or leaching therefrom may be carried into any surface water; or (5) within an area from which leaching from solid waste may have a detrimental effect on groundwater. Significant quantities of toxic and hazardous wastes shall be disposed of in separate areas and at least 10 feet above the groundwater level. This chapter tries to remedy the interrelated problems of air, land, and water pollution caused by solid waste disposal. (Johnson-Florida)
W71-10114

RULES FOR THE PREVENTION AND CONTROL OF OIL POLLUTION IN THE WATERS OF THE COMMONWEALTH.
Massachusetts Div. of Water Pollution Control, Boston.

Massachusetts Division of Water Pollution Control, Publication No 5543, 1969. 12 p.

Descriptors: *Massachusetts, *Oily water, *Administrative agencies, *Water pollution control, Pollution abatement, Water pollution treatment, Oil, Water pollution sources, Oil wastes, Water policy, Operations research, State governments, Decision making, Water pollution.

The Massachusetts Division of Water Pollution Control has established rules for the prevention and control of oil pollution. These rules are incidental to existing laws, rules, and regulations and apply without qualification to all waters of the Commonwealth. The rules are based on a categorical prohibition against causing or contributing to conditions in contravention of the established water quality standards through any manner or means of disposal of oil or matter containing oil. Facility and operating requirements are prescribed for critical areas of oil pollution, including: (1) marine oil transfer operations; (2) terminals, bulk plants and other installations handling oil; (3) disposal of waste oil; and (4) spills and accidental discharges. Compliance with these requirements is to be achieved through a licensing program for terminals and waste oil collectors and the operation of existing state remedies. (Kohla-Florida)
W71-10115

BASIN REGULATIONS--WATER QUALITY (WATER QUALITY STANDARDS, ABATEMENT, AND ENFORCEMENT PROCEDURES).
Delaware River Basin Commission, Trenton, N. J.

Administrative Manual, Part III, Mar 1970. 27 p, 2 tab.

Descriptors: *Delaware River Basin Commission, *Water quality control, *Standards, *Pollution abatement, Delaware River, River basins, Interstate Rivers, Streams, Water pollution control, Abatement, Allotments, Regulation, Water temperature, Effluents, Oxygen requirements, Dissolved oxygen, Planning, Project planning, Administration, Water resources development, New Jersey, Delaware.

The Delaware River Basin Commission's Comprehensive Plan prescribes standards which govern the review of proposed basin projects and the action taken to control and abate pollution from existing facilities. This part of the plan designates water quality standards and procedures for their enforcement. Except where respective state standards are more stringent, the River Basin standards and regulations control. The basin has been divided into two principle zones: interstate tidal and interstate non-tidal waters. Distinct protected water use categories are allocated to these two zones. The designated protected use (s) for each zone or subzone determines the water quality objectives for that particular area, and these objectives form the basis for the respective effluent quality requirements. The water quality objectives are presented in the form of technical specifications; the effluent quality requirements are delineated in both descriptive and technical terms. Enforcement of the effluent quality requirements is predicated upon the maximum practical utilization of the powers of water pollution control agencies of the signatory parties. After compliance with prescribed administrative procedures, the Commission may also issue an abatement order and invoke those sanctions provided in the compact. (Kohla-Florida)
W71-10116

WATER POLLUTION CONTROL LAWS.
Washington Dept. of Ecology, Olympia.

Sep 1970. 28 p.

Descriptors: *Washington, *Water pollution control, *Water quality control, *Legislation, Grants, Legal aspects, Administration, Administrative agencies, Regulation, State governments, Permits, Water pollution, Water policy, Water pollution sources, Water resources, Water resources development, Pollutant identification, Pollutants, Pollution abatement.

The Washington Department of Ecology has compiled all Washington laws affecting water pollution control and published them together in this pamphlet. Washington's public policy is stated to be the maintenance of the highest standards of purity for all waters of the state; the propagation and protection of wildlife, birds, game, fish and other aquatic life; the furtherance of industrial development; and to require all available and reasonable methods by industries and others to prevent and control water pollution. A water pollution control commission is created and the following are dealt with in relation thereto: (1) composition, (2) administrative procedures, (3) jurisdiction, (4) general powers, (5) authority to compel testimony and the production of books and papers, and (6) duties and responsibilities of the commission. Penalties, liability, and administrative procedures for violations of these laws are specified. Permits for waste disposal and the procedures for acquiring same are provided herein. The financing of water pollution control facilities is dealt with in the following areas: (1) bond issues, (2) grants to public bodies, (3) deposits of bond proceeds in water pollution control facilities account, and (4) a water pollution control facilities bond redemption fund. (Robinson-Florida)
W71-10117

ENVIRONMENTAL LAW: NEW LEGAL CONCEPTS IN THE ANTIPOLLUTION FIGHT,
Patrick E. Murphy.
Missouri Law Review, Vol 36, No 1, p 78-104, 1971. 27 p, 140 ref.

Descriptors: *Pollution abatement, *Public rights, *Public health, *Social aspects, Legal aspects, Water law, Water pollution, Water pollution control, Abatement, Water quality, Water quality control, Environmental sanitation, Environment, Pollutants, Water policy, Judicial decisions, Administrative decisions, Industrial wastes, Public benefits, Political aspects.

Legal tools for environmental litigation are the subject of this comment, which begins with a discussion of the traditional legal theories of nuisance, trespass, and riparian rights. A conclusion that these doctrines are not well suited to protect public rights is reached. An examination of the procedural problems in environmental litigation follows. The principal problem in private environmental litigation has been standing, but recent decisions have considerably reduced this problem. Newer ideas for environmental litigation are developed by the author. One of these is the public trust doctrine, under which public land is considered held in trust for the benefit of the public. There is also a constitutional argument for the right to a pollution-free environment, based on the ninth, fifth, and fourteenth amendments to the United States Constitution. Writs of mandamus may be used to review administrative actions. The author also evaluates class actions, declaratory judgments, and qui tam actions as tools of environmental litigation. It is concluded that courts, because of their freedom from political and economic pressures, offer a fair and impartial forum to remedy environmental wrongs and serve to notify legislators of environmental problems. (Robinson-Florida)
W71-10118

WATER QUALITY STANDARDS FOR WATERS OF INDIANA.
Indiana Stream Pollution Control Board, Indianapolis.

Regulation SPC 1R-2, 1970. 6 p.

Descriptors: *Indiana, *Water quality control, *Standards, *Waste water (Pollution), Water pollution control, Water quality, Water pollution, Regulation, Water law, Legal aspects, Pollution abatement, Water policy, Water resources, Waste disposal, Waste water disposal, Streams, Administration, Administrative agencies, Administrative decisions, State governments.

All Indiana waters shall be kept free of any discharges that will settle to form putrescent or otherwise objectionable deposits. The waters shall also be kept free from floating debris, oil, scum, and other floating materials attributable to any discharges in amounts sufficient to be unsightly or deleterious; they must also be free from discharges producing color or odor in such a degree as to create a nuisance. Nor shall any discharges be allowed which are toxic or harmful to human, animal, plant, or aquatic life. Further specific stream quality criteria are provided for the following: (1) public water supplies and the food processing industry, (2) industrial water supplies, (3) aquatic life, (4) recreation, and (5) agricultural or stock watering. (Robinson-Florida)
W71-10119

WATER QUALITY CONTROL ACT.
For primary bibliographic entry see Field 06E.
W71-10121

DEFINITIONS UNDER STATE WATER QUALITY ACT.
For primary bibliographic entry see Field 06E.
W71-10122

STATE WATER QUALITY CONTROL.
For primary bibliographic entry see Field 06E.
W71-10123

STATE WATER QUALITY CONTROL FUND.
For primary bibliographic entry see Field 06E.
W71-10124

REGIONAL WATER QUALITY CONTROL.
For primary bibliographic entry see Field 06E.
W71-10125

ENFORCEMENT AND IMPLEMENTATION OF WATER QUALITY STANDARDS.
For primary bibliographic entry see Field 06E.
W71-10126

DISCHARGES FROM HOUSEBOATS ON OR IN THE WATERS OF THE STATE.
For primary bibliographic entry see Field 06E.
W71-10128

SPECIAL WATER QUALITY PROVISIONS.
For primary bibliographic entry see Field 06E.
W71-10129

CLEAN WATER BOND LAW OF 1970.
For primary bibliographic entry see Field 06E.
W71-10130

OCEAN POLLUTION MESSAGE,
For primary bibliographic entry see Field 06E.
W71-10132

FINANCIAL RESPONSIBILITY FOR OIL POLLUTION CLEANUP.
Federal Maritime Commission, Washington, D.C.
For primary bibliographic entry see Field 06E.
W71-10133

DISCHARGES OF OIL FOR RESEARCH, DEVELOPMENT AND DEMONSTRATION PURPOSES.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 06E.
W71-10134

ADMINISTRATIVE PROCEDURE (PERMITS FOR DISCHARGES OR DEPOSITS INTO NAVIGABLE WATERS).
Corps of Engineers, Washington, D.C.
For primary bibliographic entry see Field 06E.
W71-10135

STANDARDS OF PERFORMANCE FOR MARINE SANITATION DEVICES.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 06E.
W71-10136

POLLUTION CONTROL FACILITIES--TAX EXEMPTIONS AND CREDITS.
For primary bibliographic entry see Field 06E.
W71-10137

WATER QUALITY CONTROL ACT.
For primary bibliographic entry see Field 06E.
W71-10138

SPECIAL TAX WRITE-OFF FOR POLLUTION CONTROL DEVICES.
For primary bibliographic entry see Field 06E.
W71-10139

CONSERVATION OF OIL AND GAS.
For primary bibliographic entry see Field 06E.
W71-10140

POWERS AND DUTIES OF STATE CONSERVATION COMMISSION AND WATER RESOURCES BOARD.
For primary bibliographic entry see Field 06E.
W71-10141

ENVIRONMENTAL QUALITY COMMISSION.
For primary bibliographic entry see Field 06E.
W71-10144

WATER POLLUTION.
For primary bibliographic entry see Field 06E.
W71-10145

TAX RELIEF ON POLLUTION CONTROL FACILITIES.
For primary bibliographic entry see Field 06E.
W71-10148

POLLUTION CONTROL BONDS.
For primary bibliographic entry see Field 06E.
W71-10149

BASS ANGLERS SPORTSMAN'S SOC'Y V US PLYWOOD-CHAMPION PAPERS, INC (PRIVATE PARTY HAS NO RIGHT TO ENFORCE ANTI-POLLUTION PROVISION OF RIVERS AND HARBORS ACT).
For primary bibliographic entry see Field 06E.
W71-10150

DRAINAGE DISTRICTS--POLLUTION CONTROL.
For primary bibliographic entry see Field 06E.
W71-10151

ADOPTION OF ORDINANCES BY SANITARY DISTRICTS,
For primary bibliographic entry see Field 06E.
W71-10152

OHIO V WYANDOTTE CHEMICALS CORP (SUPREME COURT DECLINES ORIGINAL JURISDICTION OVER WATER POLLUTION COMPLAINT BY STATE),
For primary bibliographic entry see Field 06E.
W71-10153

PEYTON V HAMMER (NO PRESCRIPTIVE RIGHT TO POLLUTE STREAM),
For primary bibliographic entry see Field 06E.
W71-10154

BEAN V SEARS, ROEBUCK AND CO (POLLUTION OF WELL HELD PERMANENT DAMAGE TO REAL PROPERTY),
For primary bibliographic entry see Field 06E.
W71-10155

OPEN PUBLIC HEARING TO DETERMINE WATER QUALITY STANDARDS,
For primary bibliographic entry see Field 06E.
W71-10156

REGULATIONS FOR PREVENTION OF POLLUTION OF SUBSURFACE WATERS OF THE STATE,
Missouri Water Pollution Board, Jefferson City, Mo.

1967, 3 p.

Descriptors: *Missouri, *Permits, *Subsurface waters, *Water pollution control, Water pollution treatment, Well permits, Administrative agencies, Control, Regulation, Aquifers, Well regulations, Subsurface drainage, Waste treatment, Waste water treatment, Water pollution, Percolating water, Water conservation, Administration.

The purpose of this regulation is to protect subsurface waters from pollution. A permit must be obtained from the State Water Pollution Board by any person desiring to erect, modify, commence, or operate any system for the disposal of sewage or other waste into the subsurface waters of the state. Operating permits shall specify the conditions upon which they are issued and shall be designed to carry out the purposes of the State Water Pollution Act. The Board shall issue construction permits after approving preliminary engineering reports and detailed final plans submitted by a registered engineer. The operating permit shall be issued upon the Board's determination that the completed work substantially adheres to the approved plans. Representatives of the board shall conduct periodic inspection of all operating plants. The permit of any plant operating in a fashion not in accord with approved plans shall be revoked after allowing a reasonable time for correction. The Board must be notified when any well is abandoned, and such well must be plugged or sealed to prevent pollution. No waste that causes pollution is to be placed in sinkholes which connect with aquifers. (Horwitz-Florida)
W71-10157

MARINE TOILET REGULATIONS,
Missouri Water Pollution Board, Jefferson City.

1967, 3 p.

Descriptors: *Missouri, *Boating regulations, *Sewage treatment, *Treatment facilities, Boats, Water pollution, Abatement, Legal aspects, Legislation, Standards, Public health, Sewage, Chemical degradation, Environmental sanitation, Chlorination, Sewage disposal, Sewage effluents, Construction material, Design criteria.

Pursuant to statutory authority prohibiting the discharge of body wastes from vessels, the Missouri Water Pollution Board herein promulgates regulations for the operation of marine toilets. Sewage treatment devices for marine toilets must provide adequate treatment so that the discharged effluents meet the minimum standards specified in the regulations. Pretreatment of solid wastes is required to reduce particle size sufficiently to permit the required degree of disinfection. The disinfectant used must comply with specified health and safety measures. The materials used must be able to withstand the various corrosive effects of the sewage, disinfectant, and water. Standards for the design and construction of marine toilets are established. Any toilet not in compliance with the standards established shall have its discharge fitting securely capped or plugged, and the connection between the toilet and the discharge fitting removed. (Gallagher-Florida)
W71-10158

REGULATIONS FOR TURBID WATER DISCHARGES AND TO PREVENT INTERMITTENT OR ACCIDENTAL POLLUTION OF WATERS OF THE STATE,
Missouri Water Pollution Board, Jefferson City, Mo.

1967, 2 p.

Descriptors: *Missouri, *Turbidity, *Storage tanks, *Water quality control, Regulations, Standards, Sludge disposal, Waste disposal, Legal aspects, Legislation, Panning, Industrial wastes, Public health, Water pollution sources, Embankments, Dikes, Barriers, Pollution abatement, Safety, Accidents, Oil.

The turbidity of any waste discharge from a sand, gravel, iron ore, barite or other similar washing operation shall not exceed certain maximum amounts at the point of discharge. The turbidity shall be measured by methods approved by the Water Pollution Board. In no case shall the resultant turbidity exceed the turbidity standard set for the particular stream. A turbidity standard for clear water is also specified. Storage facilities for materials which are hazardous to the public health, or capable of causing pollution if accidentlly discharged, shall be located so as to prevent any spillage which might result in water pollution or substantial damage to sewage collection systems or waste treatment works that discharge into state waters. Measures to entrap spillage of such materials, such as catchment areas, relief vessels, or entrapment dikes, shall be installed so as to prevent accidental pollution. Site locations and preventive measures may be inspected by the Board. (Gallagher-Florida)
W71-10159

WATER QUALITY STANDARDS FOR INTERSTATE WATERS,
Kentucky Water Pollution Control Commission, Frankfort.

Regulations WP-4, 1969, 5 p.

Descriptors: *Kentucky, *Water quality, *Regulation, *Interstate rivers, Standards, Water pollution, Water pollution sources, Bacteria, Administrative agencies, Water quality control, Sampling, Water policy, Interstate, Ohio River, Tennessee River, Mississippi River, Streams, Water temperature.

The minimum water quality conditions applicable to all interstate waters within Kentucky are set forth herein. Conditions or factors considered include: (1) degrees of sludge deposits, (2) floating materials, (3) materials causing odor, and (4) toxic or harmful substances. The standards set forth for each of these factors apply to the Mississippi, Ohio, Tennessee, Cumberland, and Big Sandy Rivers. Minimum water quality conditions for intrastate stream use classification, with specific minimum conditions given for each. The five major use classifications are: (1) public water supply and food processing industries, (2) industrial water supply, (3) aquatic life, (4) recreation, and (5) agriculture. Criteria are set forth governoring the acceptable amounts of pollution for each use classification. These criteria include: bacteria threshold odor number, dissolved solids, radioactive substances, chemical constituents, pH factor, and temperature. (Horwitz-Florida)
W71-10160

POLLUTION FROM BOATS AND VESSELS,
Kentucky Water Pollution Control Commission, Frankfort.

Regulation WP-5, 1969, 4 p.

Descriptors: *Kentucky, *Boating regulations, *Waste disposal, *Administrative agencies, Water pollution, Boats, Regulation, Control, Sewage, Wastes, Sewage disposal, Water pollution sources, Recreation wastes, Water pollution control, Water quality control, Sewage treatment, Administration.

The discharge of sewage, industrial wastes, or other wastes into the waters of the Commonwealth from any vessel is prohibited, except as specifically authorized by the Kentucky Water Pollution Control Commission. The discharge of sewage accumulated in holding tanks on a vessel in such a manner that the sewage reaches or may reach the water is prohibited unless disposal is through systems or treatment works approved by the Commission. The regulation prohibits any motorboat equipped with toilet facilities from being operated on the waters of Kentucky unless the boat is equipped with an approved water pollution control device. The specifications for holding tanks and incinerators are enumerated, while devices with effluent discharges must be approved on an individual basis by the Commission. All water pollution control devices must be maintained in satisfactory working condition at all times that the motorboat is in operation. A list of the approved types of water pollution control devices for use on motorboats may be obtained upon request from the Commission. (Horwitz-Florida)
W71-10161

PROCESS CONTROL MODEL FOR OXYGEN REGENERATION OF POLLUTED RIVERS, PHASE II,
Rutgers Univ., New Brunswick, N.J. Dept of Chemical Engineering.
Burton Davidson.
Available from the National Technical Information Service as PB-201 058, $3.00 in paper copy, $0.95 in microfiche. Water Resources Research Institute, Rutgers University, New Brunswick, N.J., Apr 1971, 30 p, 1 fig, 7 tab, 18 ref. OWRR B-019-N.J. (1).

Descriptors: *Systems analysis, *Water quality control, *Optimization, *Water pollution.
Identifiers: *Frequency response analysis, *Optimal control theory, Biochemical oxygen demand distribution.

A new parameter estimation procedure has been invented for the direct field determination of the natural reaeration coefficient by frequency response analysis. By the use of a mechanical in-stream aerator device, which is operated in a periodic fashion with a variable amplitude, it is possible to determine quantatively the value of the natural reaeration coefficient from field measurements of dissolved oxygen concentration. The method makes use of a detailed one-dimensional, unsteady-state Streeter-Phelps type model of a polluted river. Also, nonlinear optimal control theory has been applied to the distributed BOD problem in polluted rivers. The use of selected effluent dispersion patterns along a continuous stretch of a watercourse have a marked influence on residence time distribution patterns and the character of source and sink terms in the bio-systems models. Enhanced assimilative capacities for polluted river segments have been demonstrated through the use of appropriate distirubtion policies derived theoretically for a semi-hypothetical river using nonlinear optimal control theory. Included in the control theory analyses are dual water quality standards and economic factors for pipeline distributors and waste treatment plants. (See also W71-03015) (Whipple-Rutgers)
W71-10162

CONCEPT DEVELOPMENT OF A HEAVY DUTY OIL CONTAINMENT SYSTEM FOR USE ON THE HIGH SEAS. VOLUME II. APPENDIX,
Atlantic Research Corp, Costa Mesa, Calif. Missile Systems Div.

Available from the National Technical Information Service as AD-721 485, $3.00 in paper copy, $0.95 in microfiche. U. S. Coast Guard Report 714102/A/006, Jan 1971, 226 p. DOT-CG-00, 492-A.

Descriptors: *Water pollution control, *Oil wastes, *Test procedures, *Barriers.
Identifiers: Containment, *Oil pollution, *Water pollution control equipment.

The report presents selected photographic segments of the model testing referenced in Vol. I, AD-719 615. Test conductors run record and comments are attached for supplementary information.
W71-10164

LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
Wilson Industries Inc., Houston, Tex. Oil Containment Div.
John R. Houser.
Available from the National Technical Information Service as AD-719 277, $3.00 in paper copy, $0.95 in microfiche. U. S. Coast Guard Report 714102/A/001, Jan 1971, 500 p. DOT-CG-00, 490-A.

Descriptors: *Water pollution, *Oil wastes, *Water pollution control, *Floats, Hydrodynamics.
Identifiers: Flexible water pollution, *Flexible structures, Model tests, Mathematical models, *Oil pollution, Oil spills, Oil retention booms, *Water pollution control equipment.

The report presents the results of studies and tests of a low tension light weight oil containment system. The system is capable of deployment from an aircraft and deploys rapidly with a minimum of support equipment. The barrier design described uses an external tension shock absorbing bridle line to insure the barrier a high degree of high sea surface confirmability. (See also W71-10166)
W71-10165

HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
Wilson Industries Inc., Houston, Tex. Oil Containment Div.
John R. Houser.
Available from the National Technical Information Service as AD-719 278, $3.00 in paper copy, $0.95 in microfiche. U. S. Coast Guard Report 71410/A/004, Jan 1971, 596 p. DOT-CG-00, 490-A.

Descriptors: *Water pollution control, *Oil wastes, *Aeration, *Water pollution, Pipes, Bubbles, Hydrodynamics.
Identifiers: Oils, *Pneumatic systems, *Flexible structures, Model tests, Test facilities, *Oil pollution, Oil spills, *Water pollution control equipment.

The report presents the results of studies and tests of a pneumatic heavy duty oil containment system. Development is accomplished using large Coast Guard vessels or navy salvage ships. The design is intended for long development periods. The barrier design described uses a pneumatic curtain to contain the oil. The curtain air is provided by raft mounted compressors in juxtaposition to the submerged perorated pipe. (See also W71-10165)
W71-10166

BY-PASSING OF SEWAGE, INDUSTRIAL, AND OTHER WASTE TREATMENT PLANTS; AND EMERGENCY, ACCIDENTAL, OR OTHER EXCESSIVE SPILLS AND DISCHARGES OF SEWAGE, INDUSTRIAL OR OTHER WASTES.
Kentucky Water Pollution Control Commission, Frankfort.

Regulation WP-3, 1958, 2 p.

Descriptors: *Kentucky, *Regulation, *Administrative agencies, *Permits, Control, Water policy, Sewage disposal, Water pollution sources, Treatment facilities, Supervisory control, Inspection, Waste treatment, Sewage treatment, Waste water treatment, Water pollution, Water pollution control, Administration, Discharge (Water).

Whenever it is necessary to by-pass a sewage, industrial, or other waste treatment works, disposal system, or outlet into receiving waters, prior notice of same shall be given by phone, telegram, or other appropriate means to the Water Pollution Control Commission. Notice must be given in a manner which allows adequate time for the Commission to determine whether any harmful effects shall result to the receiving streams, public health, or legitimate downstream water uses. In cases of emergency or accidental discharge of sewage or other waste from impoundments, treatment works, disposal systems or outlets, storage basins, or other facilities, the responsible party shall immediately notify the Commission. Failure to report any such by-pass or accidental discharge shall result in automatic revocation of any Commission permit. (Horwitz-Florida)
W71-10167

FREEDMAN V BOROUGH OF WEST HAZELTON (PUBLIC NUISANCE CAUSED BY DISCHARGE OF SEWAGE INTO DITCH).
For primary bibliographic entry see Field 06E.
W71-10197

CITY OF HIGHLAND V AUER (CITY'S LIABILITY FOR PERMITTING RESIDENTS TO POLLUTE ITS SEWERS).
For primary bibliographic entry see Field 06E.
W71-10198

ATLANTA COASTAL REGION, MULTI AGENCY OIL AND HAZARDOUS MATERIALS, POLLUTION CONTINGENCY PLAN, REGION IV.
Coast Guard District (7th), Miami, Fla.

Available from the National Technical Information Service as PB-198 053, $3.00 in paper copy, $0.95 in microfiche. U.S. Coast Guard District report D7-71-1, December 1970, 425p.

Descriptors: *Oil wastes, *Water pollution control, *Institutional aspects, *Planning.
Identifiers: *Hazardous materials, *Oil pollution, Water pollution detection.

The Atlanta Coastal Region Pollution Contingency Plan was prepared within the framework of the National Multi-agency Oil and Hazardous Materials Pollution Contingency Plan pursuant to the provisions of the Water Quality Improvement Act of 1970 (PL 91-224). The plan provides for efficient, coordinated and effective action, to minimize damage from oil (and other hazardous materials) discharges, including containment, dispersal and removal. The plan includes (a) assignment of duties and responsibilities, (b) identification, procurement, maintenance and storage of equipment and supplies, (c) establishment of strike forces and emergency task forces, (d) a system of surveillance and notification, (e) establishment of a national center to coordinate and direct operations, (f) procedures and techniques to be used in identifying, containing, dispersing and removing oil, and (g) a schedule identifying dispersants and other chemicals that may be used in carrying out the Plan and the waters in which they may be used.
W71-10200

REAERATION OF STREAMS AND RESERVOIRS ANALYSIS AND BIBLIOGRAPHY,
Bureau of Reclamation, Denver, Colo. Engineering and Research Center.
D. L. King.
Available from the National Technical Information Service as PB-197 954, $3.00 in paper copy, $0.95 in microfiche. Bureau of Reclamation report REC-OCE-70-55, Dec 1970. 131 p, 2 fig, 7 tab, 448 ref.

Descriptors: *Aeration, *Reservoirs, *Dissolved oxygen, *Water quality control streams, Instrumentation, Oxygen sag, Mathematical analysis, Mass transfer, Methodology, Industrial waste treatment, Sewage treatment, Cavitation, Biochemical oxygen demand, *Reaeration, Oxygen requirements.
Identifiers: Cavitation control, Oxygen exchange, Empirical equations, Formulas.

Bureau of Reclamation responsibility for maintaining or enhancing the water quality associated with its projects has resulted in a comprehensive program of research in water quality and pollution control. A literature search and state-of-the-art review to determine the need for future research in reaeration of streams and reservoirs revealed a large number of references concerning the application of aeration methods and equipment to waste treatment. Generally, the application of this technology to aeration of large volumes of water such as rivers and reservoirs remains to be developed, although several applicable references were found. Questions regarding atmospheric reaeration in streams remain unresolved. Research is also needed regarding the aeration capability of hydraulic structures and control devices, development of new methods and equipment, effects of dissolved air on cavitation, and comparative economics of various methods and equipment. Ecological effects of reaeration are being considered in a separate review.
W71-10202

CITY OF SPRINGFIELD V NORTH FORK OUTLET DRAINAGE DIST (PREVENTING DRAINAGE DISTRICT FROM STRAIGHTENING RIVER).
For primary bibliographic entry see Field 06E.
W71-10203

COOK V CITY OF DU QUOIN (CITY'S LIABILITY FOR POLLUTION OF STREAM).
For primary bibliographic entry see Field 06E.
W71-10204

WHITE V EDGERLY PETROLEUM CO (POLLUTION OF RICE CROP BY SALINE WATER FROM OIL WELL).
For primary bibliographic entry see Field 06E.
W71-10205

WATER QUALITY STANDARDS FOR INTERSTATE WATERS IN WYOMING.
Wyoming Dept. of Public Health.

Wyoming Department of Public Health, Water Quality Standards for Interstate Waters (1968). 14 p.

Descriptors: *Wyoming, *Water pollution control, *Water quality control, *Standards, Pollution abatement, Water pollution, Water quality, Water policy, State governments, Regulation, Administration, Administrative agencies, Water law, Legal aspects, Waste disposal, Salinity, Water resources, Rivers, Streams, Interstate rivers.

The basic water quality standards for interstate waters of Wyoming are set forth in this publication. Specific water quality standards are provided for the interstate waters of southeastern Wyoming, northeastern Wyoming, northwestern Wyoming, and those waters west of the continental divide. The water quality standards for these regions are also subdivided into standards for specific waters. Prior to setting forth the water quality standards the states' water policy is explained, as are necessary definitions. (Robinson-Florida)
W71-10214

WATER WELLS AND CATHODIC PROTECTION WELLS.
For primary bibliographic entry see Field 06E.
W71-10217

PENALTIES FOR OIL DEPOSITED IN STATE WATERS.
For primary bibliographic entry see Field 06E.
W71-10218

DISPOSAL OF CERTAIN SUBSTANCES; OPERATION OF CERTAIN EQUIPMENT.
For primary bibliographic entry see Field 06E.
W71-10219

POLLUTION OR NAVIGABLE WATERS AND POLLUTION BY VESSELS.
For primary bibliographic entry see Field 06E.
W71-10220

POLLUTION OF WATER SUPPLIES AND PUBLIC PLACES.
For primary bibliographic entry see Field 06E.
W71-10221

SEWAGE AND OTHER WASTE; PROCEDURE FOR ABATEMENT.
For primary bibliographic entry see Field 06E.
W71-10222

WATER POLLUTION CONTROL.
For primary bibliographic entry see Field 06E.
W71-10223

WATER POLLUTION CONTROL ACT.
For primary bibliographic entry see Field 06E.
W71-10225

VILLAGE SAFE WATER ACT.
For primary bibliographic entry see Field 06E.
W71-10226

WATER POLLUTION.
For primary bibliographic entry see Field 06E.
W71-10227

SOLID WASTE DISPOSAL ACT.
For primary bibliographic entry see Field 06E.
W71-10228

TEXAS WATER QUALITY ACT.
For primary bibliographic entry see Field 06E.
W71-10230

GULF COAST WASTE DISPOSAL AUTHORITY (STATE POLLUTION CONTROL BY REGIONAL AGENCY).
For primary bibliographic entry see Field 06E.
W71-10231

POWERS AND DUTIES OF GAME AND FISH DEPARTMENT--POLLUTION OF WATERS.
For primary bibliographic entry see Field 06E.
W71-10232

PROHIBITION AGAINST DUMPING WASTE MATERIAL IN WATERWAYS.
For primary bibliographic entry see Field 06E.
W71-10234

WATER POLLUTION--OIL DISCHARGES.
For primary bibliographic entry see Field 06E.
W71-10235

FUNCTIONS OF HEALTH DEPARTMENTS (WATER POLLUTION AND QUALITY CONTROL).
For primary bibliographic entry see Field 06E.
W71-10236

OKLAHOMA WATER POLLUTION CONTROL ACT OF 1955.
For primary bibliographic entry see Field 06E.
W71-10238

POLLUTION CONTROL COORDINATING ACT OF 1968.
For primary bibliographic entry see Field 06E.
W71-10240

DELETERIOUS SUBSTANCES IN STREAMS (CRIMINAL PENALTIES AND ABATEMENT).
For primary bibliographic entry see Field 06E.
W71-10241

ACT AUTHORIZING MUNICIPAL CORPORATIONS TO PURCHASE OR CONDEMN LAND FOR WATERWORKS AND THE PROTECTION THEREOF FROM POLLUTION.
For primary bibliographic entry see Field 06E.
W71-10242

OKLAHOMA FEED YARDS ACT.
For primary bibliographic entry see Field 06E.
W71-10243

CONTROL OF CONTAMINATION AND POLLUTION IN SPECIAL AREAS AND WATERS.
For primary bibliographic entry see Field 06E.
W71-10245

STATE MARINE BOARD.
For primary bibliographic entry see Field 06E.
W71-10246

DISCHARGING REFUSE INTO DRAINAGE FACILITIES PROHIBITED.
For primary bibliographic entry see Field 06E.
W71-10247

WATER SUPPLY AND SEWAGE.
For primary bibliographic entry see Field 06E.
W71-10248

INTRUSION AND POLLUTION OF WATER--RELATIONSHIPS WITH GAS AND OIL.
For primary bibliographic entry see Field 06E.
W71-10250

WATER POLLUTION CONTROL (CONSTRUCTION GRANTS FOR POLLUTION CONTROL FACILITIES).
For primary bibliographic entry see Field 06E.
W71-10251

WATER POLLUTION ABATEMENT,
For primary bibliographic entry see Field 06E.
W71-10252

ADMINISTRATION OF POLLUTED WATERS,
For primary bibliographic entry see Field 06E.
W71-10253

STATUS OF WATER QUALITY AND SIGNIFICANT SOURCES OF WASTE WATER DISCHARGES IN MARYLAND.
Maryland Dept. of Water Resources, Annapolis; and Maryland Dept. of Health and Mental Hygiene, Annapolis.

Maryland Dept. of Water Resources and Dept. of Environmental Health Services, 1970, 135 p, 1 fig, 80 tab.

Descriptors: *Maryland, *Water pollution, *Water quality, *Standards, Pollution abatement, Water pollution control, Water pollution sources, Water quality control, Watersheds (Basins), Waste water disposal, Waste disposal, Waste water (Pollution), Sewage disposal, Sewage treatment, Municipal wastes, Industrial wastes, Administrative agencies, Administration, State governments, Legal aspects, Pollutants, Acid mine water, Regulation.

Set forth herein is a comprehensive description of the quality of Maryland's waters and of the activities of the Department of Water Resources and the Department of Health in enforcing water quality requirements and controlling water pollution caused by the discharge of industrial wastes and sanitary sewage. Due to continuing enforcement of water quality regulations and corresponding efforts by industry to comply with water quality reguirements, the overall enforcement program is showing success. Efforts to upgrade and improve the facilities and operations of sanitary treatment plants throughout the state are described. The water pollution control authority of the departments are set forth. Sources of water pollution are organized as to watersheds. The watershed approach makes possible an evaluation of the water quality of an entire drainage basin in terms of the cause and effect of pollutional loads. Each drainage basin is discussed with water quality summaries and listings of those industrial plants and sewage facilities not meeting water quality standards. A list of coal mining operations indicates those not complying with water quality standards. (Smiljanich-Florida)
W71-10254

WATER POLLUTION CONTROL IN COLORADO.
Robert A. Backus.
University of Colorado Law Review, Vol 36, p 413-425, 1964, 13 p, 78 ref.

Descriptors: *Colorado, *Water pollution control, *Administrative agencies, Water policy, Abatement, Pollution abatement, Water quality control, Water treatment, Regulation, Water pollution treatment, Water pollution, Water quality, Public health, Legal aspects, Control, Inspection, Permits, Standards, Local government.

Water pollution problems in Colorado are discussed, along with different methods of dealing with them. Specific attention is given to legislation and activities in the area, centering around the state Department of Health, which is the major pollution control agency for Colorado. Other state agencies discussed include: the Game, Fish and Parks Commission; the Colorado Water Conservation Board; the State Engineer; and local governments. Federal legislation dealing with water pollution is considered, with attention given to the Federal Water Pollution Control Act and the resulting federal-state relations in this area. Finally, proposed legislation on water pollution controll in Colorado is considered with respect to the goals of such legislation. (Horwitz-Florida)
W71-10255

WATER QUALITY STANDARDS.
Delaware Water and Air Resources Commission, Dover.

1967, 33 p.

Descriptors: *Delaware, *Water quality, *Standards, *Water quality control, Legislation, Legal aspects, Watersheds (Basins), Water pollution, Water pollution control, Public health, Water resources, Interstate rivers, Impaired water quality, Regulation, Watershed management, Waste disposal.

The policy of the Delaware Water and Air Resources Commission is to maintain the quality of state waters. Pursuant to this policy, the Commission establishes specific water quality standards for each drainage basin within the state. These quality standards are based on general criteria setting minimum standards for stream quality and waste discharges. Where conflicts develop between stated water uses, stream criteria, or discharge criteria, water uses shall be paramount in determining the required stream criteria, which in turn shall be the basis for individual discharge limits. Maintenance of stream quality criteria is dependent upon: (1) the existence of short transition zones between areas of different quality, (2) the ability of the Commission to measure and determine compliance, and (3) the maintenance of tributary-stream quality such that it will not interfere with the attainment of the stream criteria set for each interstate stream. (Gallagher-Florida)
W71-10257

WATER POLLUTION CONTROL IN COLORADO.
Colorado Dept. of Health, Denver.

N.D., 25 p.

Descriptors: *Colorado, *Water pollution control, *Water quality, *Pollution abatement, Water pollution, Water pollution sources, Water pollution effects, Water quality control, Irrigation, Irrigation water, Waste disposal, Adoption of practices, Water Quality Act, Legislation, Mine wastes, Mine drainage, Domestic wastes, Municipal wastes, Sewage, Farm wastes, Cesspools, Sewage disposal, Sewage treatment, Water pollution treatment, Regulation.

The increasing population growth has overburdened the self-purification ability of natural waters, rendering pollution control necessary. Pollution in Colorado generally begins where streams pass population centers. This pollution is primarily caused by domestic wastes and industrial wastes, along with waste from both open and abandoned mines. Agricultural runoff is also a major source of water pollution. Approximately one-half of all irrigation water returns to the watercource carrying additional minerals dissolved from the soil. Chemical pesticides also flow into watercourses with rain and irrigation water. Additionally, animal wastes from feedlots pose a serious water pollution problem. Before enactment of the federal Water Quality Act in 1965, both state and federal pollution laws were ineffective. The Water Quality Act, however, required the states to adopt water quality standards, and Colorado adopted the Water Pollution Control Act. The Act implements pollution control through stream surveillance and programs to abate pollution from: (1) agriculture, (2) mines, (3) feedlots, (4) oil wastes, (5) trailers and campers, and other recreational activities. Regulations for septic tanks and combined sewer systems were adopted. (Hart-Florida)
W71-10258

RULES AND GUIDELINES FOR WATER POLLUTION CONTROL AT LIVESTOCK CONFINEMENT AREAS AND GUIDELINES FOR CONSTRUCTION OF SEALED EVAPORATION AND RETENTION PONDS.
Colorado Dept. of Health, Denver. Water Pollution Control Commission.

1970, 11 p, 3 plate.

Descriptors: *Colorado, *Confinement pens, *Farm wastes, *Water pollution control, Water pollution, Water pollution sources, Pollutants, Pollution abatement, Livestock, Waste disposal, Regulation, Administrative agencies.

Feedlot operators must take preventive measures to avoid water pollution from surface runoff or the appurtenant sludge storage areas. Minimum preventive measures include: (1) sealed construction and retention ponds; (2) collection of surface runoff; (3) mechanical cleaning of areas contributing to pollution; (4) solid waste disposal; and (5) diversion of surface waters before contact with contaminated areas. The Water Pollution Control Commission may require adoption of any of these measures and will establish a pollution abatement schedule. Furthermore, guidelines for control of water pollution from feedlots are promulgated. Confinement areas must be properly graded to promote drainage, and drainage ditches must be provided as necessary. An engineering report is recommended for review by the Commission before construction. Requirements for both sealed evaporation ponds and sealed retention ponds with land application are provided. Additionally, guidelines for construction of evaporation or retention ponds are furnished. Included are: (1) recommended dimensions for embankments and dikes; (2) criteria for the pond bed; and (3) settling tank requirements. (Hart-Florida)
W71-10259

GENERAL RULES AND REGULATIONS RELATING TO WELLS.
Utah Dept. of Natural Resources, Salt Lake City. Div. of Oil and Gas Conservation.
For primary bibliographic entry see Field 06E.
W71-10260

POLLUTION AND ATTENDANT PROBLEMS,
Paul Brown.
Oklahoma Bar Association Journal, Vol 40, No 7, p 417-422, 1969, 6 p, 13 ref.

Descriptors: *Oklahoma, *Injection wells, *Water pollution control, *Saline water, Legislation, Judicial decisions, Water law, State governments, Administrative agencies, Legal aspects, Regulation, Oil industry, Injection, Oil wells, Coordination, Pollution abatement, Waste water disposal, Secondary recovery (Oil), Water utilization, Water pollution sources.

The oil industry is increasingly concerned with problems of disposing of salt water. In 1968, an Oklahoma statute created a Department of Pollution Control to coordinate the efforts of the various state agencies having authority over water pollution control. In addition, the Department has the power to prevent or abate any pollution of the waters when the appropriate agency fails to do so. The control over the disposition of sub-surface salt water is vested in the Oklahoma Corporation Com-

mission. The case law indicated several interesting situations as to the use and injection of salt water. Several cases imply that the right granted by one cotenant to inject salt water furnishes a right of entry and of use, even though other cotenants did not consent to the agreement. However, the non-consenting cotenants may not be precluded from making the same use of the injection well. Also, the trend of the case decisions is that fresh water or groundwater probably cannot be used for injection purposes, though in all likelihood an operator would be able to use salt water for injection purposes. (Johnson-Florida)
W71-10261

LOCAL AND REGIONAL WATER POLLUTION CONTROL IN TEXAS,
Thomas W. Jacks.
Texas Law Review, Vol 48, No 7, p 1286-1384, 1970, 99 p, 514 ref.

Descriptors: *Texas, *Water pollution control, *Water quality control, *Waste water (Pollution), Water pollution, Water quality, Pollution abatement, Water policy, Water resources, State governments, Cities, Local governments, Wastes, Waste disposal, Legal aspects, Water law, Waste water disposal, River basins, Rivers, Administrative agencies, Administration, Regulation.

Centering on present and future local and regional water quality control in Texas, this article begins with an examination of pollution control at the municipal and county levels. Statutory authority for waste disposal, inspection, and enforcement is set forth. Functions to be performed by cities and counties are also discussed. River authorities and the Gulf Coast Waste Disposal Authority are considered in their relation to regional water quality control. Many problems arise with respect to cooperation between local governoring units. Questions as to the advisability and recommended nature of future regional control in Texas are posed and examined. The author suggests that planning and implementation of waste disposal should be directed by basin-wide authorities. These authorities should be given a substantial voice in setting permit standards, and river authorities should have an inspection function. While local governments should establish aggressive inspection and enforcement programs, the state should have the primary responsibility for enforcement. (Robinson-Florida)
W71-10262

WATER POLLUTION CONTROL (ALLOCATION OF REGULATORY POWER IN TEXAS),
For primary bibliographic entry see Field 06E.
W71-10263

PESTICIDE POLLUTION,
Robert E. Walls.
Texas Law Review, Vol 48, No 6, p 1130-1168, 1970, 39 p, 250 ref.

Descriptors: *Texas, *Pesticides, *Regulation, *Pollution abatement, Pesticide drift, Pesticide residues, Path of pollutants, Pollutants, Water pollution sources, Water quality, Administrative agencies, DDT, Control, Water pollution, Standards, Water, Water pollution effects, Legislation, Federal government, State governments.

The effects of pesticide pollution and governmental steps to curb the problem are considered. The means of surveillance, by the United States Geological Survey and the Texas Water Development Board, of pesticide pollution in Texas are discussed and termed inadequate. The limited surveillance by the Texas Department of Health and Parks and the Wildlife Department is also discussed. The means of controlling pesticide pollution under Texas and federal laws are next considered. Laws in this area include: regulation of the sale and transportation of pesticides, and direct as well as indirect control of pesticide use. The role of air and water pollution control statutes in pesticide regulation is also examined. The benefit of public education as a means of pollution control is considered, along with proposed new legislation. The lack of effective state control in this area of pollution is critized, and two effective methods of controlling pesticides on the state level are put forth: (1) direct regulation of the use of all pesticides, and (2) proper evaluation of environmental hazards in the registration of pesticides for sale. (Horwitz-Florida)
W71-10264

THE TEXAS WATER QUALITY BOARD,
D. Scott Greene, John B. Kyle, and John A. Watson.
Texas Law Review, Vol 48, No 6, p 1047-1085, 1970, 39 p, 258 ref.

Descriptors: *Texas, *Administrative agencies, *Regulation, *Water pollution control, Permits, State governments, Water allocation (Policy), Standards, Water zoning, Abatement, Control, Inspection, Legal aspects, Water policy, Water pollution, Water utilization, Water quality control, Water pollution effects, Waste treatment, Waste assimilative capacity.

The Texas Water Quality Board's operations in controlling pollution are studied in detail, with emphasis on three of its major functions: promulgation of water quality standards, issuance of permits, and enforcement. The primary impetus for adopting water quality standards in Texas was the Federal Water Pollution Control Act of 1965. In establishing standards the Board makes two types of decisions for each water zone into which the state is divided. The uses of each zone of water to be protected are determined; then water quality parameters are established to protect the desired uses. The permit system is examined in detail, along with alternative methods of water quality control. The permit system is recognized as the most important vehicle for effectuating the state's water quality policies, as defined by its water quality standards. The Board's enforcement procedures, both formal and informal, are discussed and evaluated as being not wholly effective in forcing recalcitrant violators into compliance. Special notice is taken of coordination difficulties between the Board and the state Attorney General's office and of the problem of municipal polluters. (Horwitz-Florida)
W71-10265

THE SANTA BARBARA OIL SPILL,
Malcoln F. Baldwin.
University of Colorado Law Review, Vol 42, No 1, p 33-76, 1970, 44 p, 158 ref, append.

Descriptors: *California, *Oil, *Water pollution, *Disasters, Water pollution sources, Pollution abatement, Water quality, Oil industry, Federal government, Oil fields, Oil wells, Blowouts, Water pollution control, Continental shelf, Drilling, Beds, Legislation, Wildlife, Ecology, Environmental effects, Pollutants, Administrative agencies, Aesthetics, Long-term planning, Legal aspects, Judicial decisions.
Identifiers: *Oil spills.

The Santa Barbara oil spill of 1969 is examined with respect to the legal effects of the environmental disaster. A chronology of events before and after the spill emphasizes the magnitude of its pollutional effects and the massive clean-up operation engendered. The decision to open up oil leases in the Santa Barbara Channel resulted from governmental and industrial pressure for speedy action. Public opposition based primarily on aesthetic grounds was only of limited success. The Outer Continental Shelf Lands Act, the Water Pollution Control Act, and the Fish and Wildlife Act are examined to determine their effective roles in the events surrounding the oil spill. Procedural and administrative changes made by the executive department in response to the spill are noted, along with new legislative proposals related to offshore drilling and oil pollution. The principal legal actions arising from the spill are summarized, with emphasis on the legal responsibility for the spill, injunctions to prevent future drilling, and actions for damages to property, fish and wildlife. The author suggests that a disregard for long term ecological effects of new developments is a primary failure in the present management of environmental affairs. (Smiljanich-Florida)
W71-10266

WATER QUALITY CRITERIA FOR INTRASTATE WATERS.
Mississippi Air and Water Pollution Control Commision, Jackson.
For primary bibliographic entry see Field 06E.
W71-10267

ANNUAL REPORT 1970.
Delaware River Basin Commission, Trenton, N.J.

p 6-11, 1970, 6 p.

Descriptors: *Delaware River Basin Commission, *Water quality control, *Pollution abatement, *Water pollution control, Equitable apportionment, Delaware River, New York, Pennsylvania, New Jersey, Delaware, Wastes, Water quality, Municipal wastes, Industrial wastes, Administrative agencies, Toxicity, Legal aspects.

Municipalities and industries whose wasteload allocations comprise 80 per cent of the allowable organic pollution burden in the Delaware River's tidal estuary submitted pollution abatement schedules approved by the Commission during 1969-1970. This report of the Commission asserts that deterioration in tidal waters was stabilized or even reversed by this equitable apportionment program, and marked improvement was forecast for 1973-75. A table shows the 41 largest discharges, their allocated daily discharge, and expected full compliance dates. The Commission reports enforcement of regulations prohibiting stream discharge of toxic substances and the beginning of a widespread organic pollution control program in the basin's non-tidal waters. The crisis shortage in electrical power placed the Commission in a mediating position between competing interests for use of the basin's limited water supply. Progress was reported in obtaining cooperation among municipalities in regional waste treatment projects. Reports on regional waste solutions and bay and scenic river protection are included. (Madsen-Florida)
W71-10268

ANNUAL REPORT 1968.
Delaware River Basin Commission, Trenton, N.J.

p 6-13, 1968, 8 p.

Descriptors: *Delaware River Basin Commission, *Water quality control, *Water pollution control, *Equitable apportionment, Delaware River, New York, Delaware, New Jersey, Pennsylvania, Wastes, Industrial wastes, Municipal wastes, Water quality, Acidity, Turbidity, Phenols, Oxygen demand, Oxygen requirements, Chemical oxygen demand, Administrative agencies, Coliforms, Detergents, Pollution abatement, Legal aspects.

The Delaware River Basin Commission reports that the emphasis of its operations in 1967-68 shifted to pollution abatement and control in the four-state Delaware River Basin. Three steps were taken to implement water quality standards adopted the year before. (1) The doctrine of equitable apportionment was adopted by granting to each municipal or industrial waste discharger a computed share of the river's waste assimilative capacity. All waste discharged into the river must be treated to the same minimum degree for removal of pollutants. (2) Basinwide regulations governoring daily oxygen consumption of wastes in estuary waters were adopted. (3) A surveillance program was instituted to monitor discharger effluents and stream quality. The report predicts substantial compliance

with discharger treatment requirements during the 1970's. (MadsennFlorida)
W71-10269

WATER QUALITY CRITERIA.
Alabama Water Improvement Commission, Montgomery.

1967, 20 p.

Descriptors: *Alabama, *Water quality, *Water quality control, *Standards, Aquatic microbiology, Biochemical oxygen demand, Color, Mineralogy, Nitrates, Nutrients, Odor, Public health, Radioactivity, Recreation, Taste, Water chemistry, Water pollution, Water pollution control, Waste treatment.

Water quality criteria for Alabama are classified according to water usage. Seven usage classification are furnished: (1) public water supply; (2) swimming and other water contact sports; (3) shellfish harvesting; (4) fish and wildlife; (5) agriculture and industrial water supply; (6) navigation; and (7) treated waste transportation. For each of these water usages, these regulations specify maximum acceptable levels of: (1) sewage, industrial wastes, and other wastes; (2) acidity; (3) temperature; (4) dissolved oxygen; (5) toxic or color producing substances; (6) taste and odor producing substances; and (7) bacteria. Furthermore, the pamphlet provides general conditions applicable to all water quality criteria, and minimum conditions applicable to all state waters. Treatment requirements for sewage and industrial wastes are also furnished. (Hart-Florida)
W71-10271

SOME ASPECTS OF THE ALABAMA WATER IMPROVEMENT COMMISSION'S PROGRAM FOR CONTROL OF WATER POLLUTION.
Alabama Water Improvement Commission, Montgomery.

N.D., 12 p.

Descriptors: *Alabama, *Water pollution control, *Water quality, *Standards, Water pollution, Water quality control, Water usage, Biochemical oxygen demand, Waste treatment, Administrative agencies, Permits, State governments, Federal government, Waste disposal, Waste water treatment, Waste water (Pollution), Regulation.

The control of water pollution in Alabama is vested exclusively in the Water Improvement Commission. The Commission has fourteen members and endeavors to improve and conserve state waters, while recognizing water rights. Permits must be obtained from the Commission to discharge wastes. This requirement applies to existing discharges, as well as new discharges and increases in present discharges. The application must contain: (1) a description of the proposed operation; (2) a description of untreated wastes; (3) a description of the proposed treatment facility; (4) effluent characteristics; and (5) a site plan. Water quality standards have been developed to apply to 15 interstate rivers with respect to water used for: (1) public water supplies, (2) water contact sports, (3) shellfish harvesting, (4) fish and wildlife, (5) agriculture and industrial water supplies, (6) navigation, and (7) treated waste transportation. The standards have been approved by the Department of the Interior except for the temperature and dissolved oxygen criteria for fish and wildlife and shellfish usages. A field monitoring system is employed for waste and water monitoring; only one laboratory is used, however, so four years are required to cover the state. The Water Pollution Control Commission staff is available for consultation on water pollution problems, and conferences on proposed discharges are encouraged during early stages of planning. (Hart-Florida)
W71-10272

PERMITS TO DISCHARGE SEWAGE, INDUSTRIAL WASTES OR OTHER WASTES.
Kentucky Water Pollution Control Commission, Frankfort.
For primary bibliographic entry see Field 06E.
W71-10273

ENVIRONMENT REPORT--BILLS TO AUTHORIZE CLASS ACTIONS RECOGNIZE RIGHT TO CLEAN ENVIRONMENT,
For primary bibliographic entry see Field 06E.
W71-10274

FORTY YEARS OF WATER POLLUTION CONTROL IN WISCONSIN: A CASE STUDY,
Donald M. Carmichael.
Wisconsin Law Review, Vol 1967, p 359-419, 1967, 70 p, 237 ref, append.

Descriptors: *Wisconsin, *Water pollution control, *Administrative agencies, *Stage governments, Administration, Pollution abatement, Legislation, Legal aspects, Judicial decisions, Treatment facilities, Local governments, Pulp and paper industry, Dairy industry, Regulation, Water pollution sources, Basins, Watersheds (Basins).

After 40 years of administration by two separate agencies, Wisconsin's water pollution control efforts were recently merged into a single Department of Resource Development. This article provides a broad retrospective evaluation of prior regulatory agencies, describing specifically their procedures, problems, and policies. Many of these described policies and procedures, which will be continued by the new agency, developed from the state's early system of regulating polluters on the drainage basins. Aspects of the data collection, issuance and enforcement of regulatory orders, and judicial review are evaluated. Although the agencies' efforts at regulation and education of polluters were generally effective, they were critized for failure to develop imaginative legal sanctions, as well as for adequate use of available sanctions. A critical analysis is made of pollution control efforts of municipalties and of the pulp and paper, canning, and milk processing industries. The composition and duties of the new agency are also described. (Shelnut-Florida)
W71-10275

TREATMENT REQUIREMENTS.
Pennsylvania Sanitary Water Board, Harrisburg.
For primary bibliographic entry see Field 06E.
W71-10276

MINE DRAINAGE.
Pennsylvania Sanitary Water Board, Harrisburg.
For primary bibliographic entry see Field 06E.
W71-10277

SPECIAL REGULATIONS.
Pennsylvania Sanitary Water Board, Harrisburg.
For primary bibliographic entry see Field 06E.
W71-10278

REGULATIONS FOR PUBLIC WATER SUPPLIES.
Pennsylvania Dept of Health, Harrisburg.
For primary bibliographic entry see Field 06E.
W71-10279

ENVIRONMENTAL CONTROL ACT.
For primary bibliographic entry see Field 06E.
W71-10280

CHICAGO SANITARY DISTRICT--POLLUTION CONTROL.
For primary bibliographic entry see Field 06E.
W71-10281

RIVER CONSERVANCY DISTRICTS--POLLUTION CONTROL.
For primary bibliographic entry see Field 06E.
W71-10282

CERTIFICATION OF POLLUTION CONTROL FACILITIES FOR TAX RELIEF.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 06E.
W71-10283

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT.
National Marine Fisheries Service, Washington, D.C.
For primary bibliographic entry see Field 06E.
W71-10284

LICENSING OF PRODUCTION AND UTILIZATION FACILITIES (NUCLEAR POWER REACTORS).
Atomic Energy Commission, Washington, D.C.
For primary bibliographic entry see Field 06E.
W71-10286

ENVIRONMENTAL STATEMENTS--PROPOSED GUIDELINES ON PREPARATION AND COORDINATION.
Corps of Engineers, Washington, D.C.
For primary bibliographic entry see Field 06E.
W71-10287

ENVIRONMENTAL QUALITY CONTROL.
For primary bibliographic entry see Field 06E.
W71-10289

WATER QUALITY ACT.
For primary bibliographic entry see Field 06E.
W71-10290

WATER POLLUTION (STATUTORY AUTHORITY FOR ADMINISTERING POLLUTION CONTROL PROGRAM).
For primary bibliographic entry see Field 06E.
W71-10291

POLLUTION OF WATERS.
For primary bibliographic entry see Field 06E.
W71-10292

FOULING OF WATERS A MISDEMEANOR.
For primary bibliographic entry see Field 06E.
W71-10293

WATER CONSERVATION COMMISSION.
For primary bibliographic entry see Field 06E.
W71-10294

CONCERNING WATER POLLUTION, AND PROVIDING PENALTIES FOR VIOLATIONS RELATING TO POLLUTION OF STATE WATERS.
For primary bibliographic entry see Field 06E.
W71-10295

POWER OVER WATER POLLUTION CONTROL AND PENALTY FOR POISONING OF WATERS.
For primary bibliographic entry see Field 06E.
W71-10296

TAX INCENTIVE FOR COMPLIANCE WITH WATER POLLUTION LAWS AND STANDARDS.
For primary bibliographic entry see Field 06E.
W71-10297

WATER POLLUTION CONTROL.
Hawaii Dept. of Health, Honolulu.
For primary bibliographic entry see Field 06E.
W71-10298

WATER QUALITY STANDARDS.
Hawaii Dept. of Health, Honolulu.
For primary bibliographic entry see Field 06E.
W71-10299

STATE FINANCIAL ASSISTANCE TO PUBLIC AGENCIES FOR POLLUTION CONTROL FACILITIES.
Oregon Dept. of Environmental Quality, Salem.
For primary bibliographic entry see Field 06E.
W71-10301

SEADADE INDUSTRIES, INC V FLORIDA POWER AND LIGHT CO (CONDEMNING LAND PENDING APPROVAL OF FACILITY BY POLLUTION CONTROL AUTHORITIES).
For primary bibliographic entry see Field 06E.
W71-10303

REGULATIONS ON POLLUTION ABATEMENT.
Maryland Dept. of Water Resources, Annapolis.
For primary bibliographic entry see Field 06E.
W71-10304

REGULATION OF COMMERCIAL SHIPPING IN HARBORS TO CONTROL WATER POLLUTION.
For primary bibliographic entry see Field 06E.
W71-10305

STATE WATER POLLUTION CONTROL.
For primary bibliographic entry see Field 06E.
W71-10306

PROTECTION OF LAKE TAHOE WATERSHED.
For primary bibliographic entry see Field 06E.
W71-10307

COLORADO WATER POLLUTION CONTROL ACT OF 1966.
For primary bibliographic entry see Field 06E.
W71-10308

LIABILITY FOR THE FLOODING OF MINE WASTES UPON ANOTHER'S PROPERTY.
For primary bibliographic entry see Field 06E.
W71-10310

AUTO CLUB OF ST PAUL V CITY OF WHITE BEAR LAKE (RIGHT OF CITY TO CONSTRUCT SEWAGE OUTLET INTO LAKE).
For primary bibliographic entry see Field 06E.
W71-10311

WATER USE CLASSIFICATIONS AND WATER QUALITY STANDARDS.
Georgia Water Quality Control Board, Atlanta.
For primary bibliographic entry see Field 06E.
W71-10312

WATER POLLUTION AND SELF-PURIFICATION STUDY ON THE PO RIVER BELOW FERRARA,
Ferrara Univ. (Italy). Istituto di Igiene.
For primary bibliographic entry see Field 05B.
W71-10324

TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
Northeastern Univ., Boston, Mass. Dept. of Civil Engineering.
For primary bibliographic entry see Field 05B.
W71-10326

SANITARY CONTROL OF SHELLFISH.
For primary bibliographic entry see Field 06E.
W71-10360

POLLUTION AS NUISANCE.
For primary bibliographic entry see Field 06E.
W71-10361

2ND COMPENDIUM OF ANIMAL WASTE MANAGEMENT.
Federal Water Pollution Control Administration, Kansas City, Mo. Missouri Basin Region.

June 1969. 256 p, 59 tab, 33 fig, 80 ref.

Descriptors: *Farm wastes, Rainfall-runoff relationships, Legislation, *Water quality, Pollutant identification, Disposal, Runoff, Grants, Cattle, Land use, Fertilizers, Management, Economics, Nutrients, Storage, Pollution abatement, Eutrophication, Design data, Erosion.
Identifiers: Feedlot wastes, Pollution potential, Nitrate movement, FWPCA, Population equivalents, Processing, Feedlot size, Feedlot runoff, Basin-wide planning.

Twelve papers were presented at the meeting. Major emphasis was placed on cattle feedlot pollution potential. Various aspects of the pollution caused by animal waste were discussed. Sources of pollutants and effects on water quality were emphasized. History and characteristics of animal waste pollution were discussed. Methods for minimizing pollution and the economics of disposal were considered. (See also W71-10367 thru W71-10377) (Christenbury-Iowa State)
W71-10366

ANIMAL WASTE RUNOFF - A MAJOR WATER QUALITY CHALLENGE,
Federal Water Pollution Control Administration, Kansas City, Mo.
A. V. Resnik, and Rademacher.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No 1. 21 p, 26 ref.

Descriptors: *Runoff, Farm waste, Legal aspects, Eutrophication, Groundwater, Water quality, Biochemical oxygen demand, Pollutant identification, Water pollution control.
Identifiers: Feedlot runoff, Population equivalents, Pollution potential.

An overview is presented of the causes and effects of animal waste pollution on water quality. The extent of the problem as well as the effects on surface and ground waters are illustrated with research data. The present status of legislation in regulatory control of pollution is discussed. Measures to strengthen present regulations are proposed. (See also W71-10366) (Christenbury-Iowa State)
W71-10367

ANIMAL WASTES--A MAJOR POLLUTION PROBLEM,
Iowa Univ., Iowa City. Dept. of Civil Engineering.
R. R. Dague.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No 2. 14 p.

Descriptors: *Farm wastes, Biochemical oxygen demand, Chemical oxygen demand, Hogs, Cattle, Iowa, Runoff, Disposal, Management, Rainfall-runoff relationships, Retention, Water pollution control.
Identifiers: *Livestock wastes, *Characteristics, *Feedlots runoff, Population equivalents, Swine, Site selection, Trends, Animal stocking rates.

The water pollution potential of livestock wastes is discussed. The characteristics of animal wastes are discussed. The major source of water pollution from livestock is open feedlots. The control fundamentals that apply to open feedlots are discussed. Feeding facilities must be designed and operated not only to optimize meat production but also to minimize pollution. (See also W71-10366) (Christenbury-Iowa State)
W71-10368

REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
Kansas State Dept. of Health, Topeka. Environmental Health Services.
M. W. Gray.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No 3. 38 p, 14 tab.

Descriptors: *Legal aspects, Public health, *Legislation, *Fishkill, *Rainfall-runoff relationships, Farm wastes, Aquatic life, Water supply, Recreation, Management, Biochemical oxygen demand, Dissolved oxygen, Regulation, Cattle, Odor, Retention, Kansas, Water pollution control, Water pollution effects.
Identifiers: *Waste characteristics, *Feedlot runoff, Pollution potential, SHUD, Health aspects, Nuisances, Pollution control, Retention ponds.

The legal and environmental implications of pollution from cattle feedlots is discussed. A table is included that summarizes the fish kills that have been attributed to feedlot runoff in Kansas. Chapter 28, Article 18, of the Kansas State Board of Health Regulations is included. The author discusses methods for minimizing pollution of surface and groundwater from feedlots. (See also W71-10366) (Christenbury-Iowa State)
W71-10369

MANAGEMENT OF ANIMAL FEEDLOT WASTES -- LAND SPREADING AS A DISPOSAL PROCESS,
Missouri Univ., Columbia. Water Resources Research Center.
G. E. Smith.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No 4. 8 p.

Descriptors: *Management, *Farm waste, *Disposal, *Land use, Cattle, Fertilizers, Costs nutrients, Waste disposal, Water pollution control.
Identifiers: Nutrient removal, Application rate.

Disposal of animal waste onto land is effective and can increase crop yields. Attention must be given to the condition of the waste and supplemental nutrients added to insure a balanced fertilizer program. Cost of land disposal may exceed returns in terms of crop response, however land disposal can minimize animal waste disposal costs. (See also W71-10366) (Christenbury-Iowa State)
W71-10370

DESIGN FOR FEEDLOT WASTE MANAGEMENT - HISTORY AND CHARACTERISTICS,
Kansas State Univ., Manhattan. Dept. of Agricultural Engineering.
R. I. Lipper.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No 6. 9 p, 4 tab.

Descriptors: *Farm wastes, *Rainfall-runoff relations, *Pollution abatement, Biochemical oxygen demand, Runoff, Nutrients, Dissolved oxygen, Soil structure, Irrigation, Nitrogen, Detention reservoirs, Water pollution control.
Identifiers: *Feedlots, Pollution potential, Kjeldahl nitrogen.

The purpose is to illustrate the value of the cattle feeding industry to the state of Kansas; to relate its growth in the state to the emergence of a water pollution problem; and to make an attempt to describe the nature and magnitude of the problem in the best perspective that can be achieved at this time. Large-scale cattle feeding is a growth industry suited to Kansas resources and one that the state

can ill afford to ignore. Efficient livestock production methods have given rise to water pollution problems. Pollutant concentration is approximately twice as great from a concrete lot as from an unsurfaced lot. Data is presented to evaluate the pollution potential of feedlot runoff. (See also W71-10366) (Christenbury-Iowa State)
W71-10371

CONTRIBUTION OF FERTILIZERS TO WATER POLLUTION,
Missouri Univ., Columbia. Water Resources Research Center.
G. E. Smith.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No. 7, 16 p, 7 tab, 5 fig, 24 ref. PHS-FWPCA-USDI - WP00533.

Descriptors: *Eutrophication, Fertilizers, Farm wastes, Nutrients, Denitrification, Nitrification, Ammonification, Leaching, Erosion, Nitrogen, Runoff, Water pollution control, Groundwater, Septic tanks, Management.
Identifiers: *Methemoglobin, Nitrate movement, Feedlots, Residual accumulation, Soil cores.

Without chemical soil amendments the United States would be a food importing nation. Despite liberal fertilizer use, crops are removing more nitrogen and minerals than are being added in soil amendments. Many shallow wells in Missouri are contaminated with nitrates as a result of leaching from livestock feeding operations. The nitoate is not associated with losses from fertilized farm fields in most cases. There is little question that some of the nutrients applied in chemical fertilizers are moving into both surface and ground water; the percentage is thought to be relatively small. It is possible that nutrient losses may be less where good fertilization practices are followed than on unfertilized soils. (See also W71-10366) (Iowa State)
W71-10372

CATTLE FEEDLOT WATER QUALITY HYDROLOGY,
Colorado State Univ., Fort Collins. Dept. of Agricultural Engineering.
L. E. Norton, and R. W. Hansen.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No. 8, 26 p, 14 fig, 2 tab, 13 ref.

Descriptors: *Rainfall-Runoff relationships, *Liquid wastes, *Biochemical oxygen demand, Farm wastes, Dissolved solids, Hydrogen ion concentration, Alkalinity, Equipment, Simulated rainfall, Hydrology, Hydrographs, Rainfall intensity, Overland flow, Design data, Conductivity, Model studies, Water pollution control.
Identifiers: *Feedlot wastes, Pollution potential, Feedlots, Prediction method, Procedure.

Runoff wastewater from cattle feedlots is considered; the overall objective was to determine if the hydrology characteristics could be correlated with the quality characteristics through a modification of the flat plate model of overland flow. The results of the correlation could then be used to predict the quantity and quality of the runoff from existing feedlots. The data demonstrated the fact that the prediction method proposed requires extrapolation of data beyond the observed values. Therefore, additional information obtained from studies of runoff from full-scale feedlots would be advisable in determining the validity of this extrapolation. (See also W71-10366) (Christenbury-ISU)
W71-10373

MAJOR PROBLEMS OF WATER POLLUTION CREATED BY AGRICULTURAL PRACTICES,
Federal Water Pollution Control Administration, Kansas City, Mo.
Walter F. Robohn.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No. 9, 16 p.

Descriptors: *Farm wastes, *Erosion, *Water pollution sources, *Pollution abatement, Runoff, Pollutants, Sediment, Livestock, Legal aspects, Legislation, Sugar beets, Farm lagoons, Fertilizers, Salts, Irrigation, Ground water, Pollution identification, Tailwater, Water pollution effects, Water quality control.
Identifiers: *Population equivalents, Feedlots, Slaughter, Processing.

This paper discusses the magnitude of the water pollution abatement problem facing agriculture. The major acitivity which is contributing to water pollution is discussed. Sediment derived from land erosion constitutes by far the greatest mass of all the waste material arising from agriculture. The fundamentals of pollution of interest to agriculture are discussed. The control of pollution from agricultural sources is severly handicapped by lack of knowledge. It will take the combined efforts of engineers, waste treatment plant operators, city officials, agricultural people and citizens in general to solve the great national problem of water pollution. (See also W71-10366) (IowaState)
W71-10374

AGRICULTURE AS A SOURCE OF WATER POLLUTION,
Federal Water Pollution Control Administration, Charlottesville, Va. Middle Atlantic Region.
Eugene T. Jensen.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No. 10, 11 p.

Descriptors: *Legislation, *Grants, Farm wastes, Nutrients, Sediment, Chemicals, Livestock, Water quality control, Pollution abatement, Federal Government, Disposal, Research and development.
Identifiers: *FWPCA, Basin-wide planning.

Various aspects of water pollution are discussed, including sources, types of pollutants, and methods of pollution abatement. The role that the Federal Water Pollution Control Administration plays in pollution control is discussed. Research grants and contracts are awarded to support basic and applied research projects relating to the causes control, and prevention of water pollution. The need for clean and usuable water demands that we build the cost of clean water into all our operations. (See also W71-10366) (Iowa State)
W71-10375

EFFECT OF AGRICULTURE ON WATER QUALITY,
Federal Water Pollution Control Administration, Evansville, Ind. Lower Ohio Basin Office.
T. R. Smith.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No. 11, 11 p, 9 ref.

Descriptors: Water quality control, *Nutrients, *Pesticides, Farm wastes, Silt, Erosion, Sedimentation, Runoff, Fertilizers, Nitrogen, Phosphorus, Algae, Livestock, Water pollution effects.
Identifiers: Feedlots, Wabash River Basin.

The main sources of agricultural associated water pollution in humid regions are: (1) silt from soil erosion; (2) fertilizers, mainly phosphorus and nitrogen compounds (3) pesticides; and (4) organic wastes from feedlots. In arid regions, irrigation return flows are a problem. This paper discusses the effect of each of these sources can have on water quality and suggests some preventative measures. It is necessary that agriculturalists plan to control pollutional effects on their activity. (See also W71-10366) (Christenbury-ISU)
W71-10376

ECONOMICS OF WATER POLLUTION CONTROL FOR CATTLE FEEDLOT OPERATIONS,
Texas Tecnological Coll., Lubbock. Dept of Agricultural Economics.
T. R. Owens, and Wade L. Griffin.
In: 2nd Compendium of Animal Waste Management, June 1969, Paper No. 12, 62 p, 31 tab, 2 fig, 8 ref.

Descriptors: *Economic feasibility, Rainfall-runoff relationships, *Disposal, *Cost comparisons, Economics of Scale, Farm wastes, Runoff, Design criteria, Legal aspects, Costs, Biochemical oxygen demand, Evaporation, Model studies, Hydrological data, Equipment, Detention reservoirs, Odor, Systems analysis, Groundwater, Seepage, *Water pollution control.
Identifiers: *Feedlot size, Playa lake disposal, Open field disposal, Overflows, Feedlot runoff.

The economic feasibility of various methods for controlling or disposing of feedlot runoff is determined. The various design criteria were applied to three different sizes of model feedlots: (1) 5000 head, (2) 10,000 head, and (3) 25,000 head. The approach to the problem of water pollution from feedlots used here involved control of runoff by establishing collection basins and subsequently discharging the runoff to one of two disposal areas or alternatively to hold the collected runoff until natural evaporation emptied the system. In general, evaporative discharge systems were considered inferior to their mechanical counterparts because of the lower degree of protection provided and the rather extensive land requirements for construction of the collection basin. (See also W71-10366) (Iowa-State)
W71-10377

REMOVAL OF SUBSTANCES POLLUTING WATERS.
For primary bibliographic entry see Field 06E.
W71-10378

WELL TECHNOLOGY SERVES THE MINING INDUSTRY.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.
For primary bibliographic entry see Field 04B.
W71-10423

SALE OF SHELLFISH FROM POLLUTED AREAS.
For primary bibliographic entry see Field 06E.
W71-10436

MINIMUM STANDARDS OF SANITATION AND HEALTH PROTECTION MEASURES.
For primary bibliographic entry see Field 06E.
W71-10437

KLAMATH RIVER BASIN COMPACT.
For primary bibliographic entry see Field 06E.
W71-10439

REGULATION OF OIL AND GAS WELLS.
For primary bibliographic entry see Field 06E.
W71-10440

WATER AND SEWAGE.
For primary bibliographic entry see Field 06E.
W71-10442

WATER POLLUTION IN GENERAL.
For primary bibliographic entry see Field 06E.
W71-10443

PROTECTION OF FISH THROUGH POLLUTION CONTROL.
For primary bibliographic entry see Field 06E.
W71-10445

POLLUTION OF UNDERGROUND WATER.
For primary bibliographic entry see Field 06E.
W71-10446

POLLUTION OF WATERS; MAINTENANCE OF THINGS OFFENSIVE OR UNHEALTHFUL; PUNISHMENT.
For primary bibliographic entry see Field 06E.
W71-10448

POLLUTING WATER.
For primary bibliographic entry see Field 06E.
W71-10449

06. WATER RESOURCES PLANNING

6A. Techniques of Planning

WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
North Carolina Univ., Chapel Hill. Dept. of City and Regional Planning; and North Carolina Univ., Chapel Hill. Dept. of Environmental Sciences and Engineering.
For primary bibliographic entry see Field 06B.
W71-09932

LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT: THEORY AND PRELIMINARY RESEARCH DESIGN,
Oklahoma State Univ., Stillwater, Dept. of Economics.
For primary bibliographic entry see Field 06B.
W71-09937

AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
California Univ., Los Angeles. Dept. of Systems Engineering.
Hani Asfur, and William W-G Yeh.
Available from the National Technical Information Service as PB-201 005, $3.00 in paper copy, $0.95 in microfiche. Contribution No. 134, Water Resources Center, University of California, Los Angeles, March 1971. 85 p, 126 ref. OWRR Project C-1668 (No. 3154) (1).

Descriptors: *Bibliographies, *Systems analysis, *Water resources development, Optimization, Operations research, Multiple purpose, *Abstracts, Water distribution (Applied), Distribution systems, Mathematical models, Synthetic hydrology, Simulation analysis, Reservoir design.

An annotated bibliography of 126 references is presented on the application of operations research techniques to determine the best possible set of components for regional complex, multipurpose water resources systems. The optimization was subject to the hydrological, economic, social, political, legal and other constraints, as well as the usual physical limitations. The project involved substantial cooperative participation of the U.S. Bureau of Reclamation, Region 2, Sacramento, California and California Department of Water Resources, Sacramento, California. This work should provide useful information to those who are doing research in optimal design of water resources systems. The abstracts were categorized by subject matter: (1) single-facility and single-purpose water resources systems, (2) single-facility and multi-purpose water resources systems, (3) multi-facility and single-purpose water resources systems, (4) multi-facility and multi-purpose water resources systems, (5) synthetic hydrology and streamflow generation models, and (6) distributed network water resources systems. Included was an author-subject index. (Veverka-Cornell)
W71-09938

DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
New Hampshire Univ., Durham. Inst. of Natural and Environmental Resources.
For primary bibliographic entry see Field 05B.
W71-09942

THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
Hydrological Research Unit. Wallingford (England).
For primary bibliographic entry see Field 02A.
W71-10020

PARAMETER ESTIMATION FOR WET-DAY SEQUENCES,
Agricultural Research Service, Beltsville, Md. Hydrograph Lab.
For primary bibliographic entry see Field 02B.
W71-10023

PARAMETER ESTIMATION IN HYDROLOGY: THE STATE OF THE ART,
Pennsylvania State Univ., University Park. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02F.
W71-10025

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
Agricultural Research Service, Tucson, Ariz. Southwest Watershed Research Center.
For primary bibliographic entry see Field 02A.
W71-10027

SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
Agricultural Research Service, University Park, Penn. Northeast Watershed Research Center.
For primary bibliographic entry see Field 02A.
W71-10028

ANNUAL, SEASONAL, AND MONTHLY CHANGES IN RUNOFF IN THE UNITED STATES,
Indiana Univ., Bloomington. Dept. of Geography.
For primary bibliographic entry see Field 02E.
W71-10029

STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
Underwood McLellan and Associates Ltd., Winnepeg (Manitoba).
For primary bibliographic entry see Field 02A.
W71-10172

EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
Arizona Univ., Tucson.
For primary bibliographic entry see Field 07A.
W71-10314

STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
National Aeronautic and Space Administration, Hampton, Va. Langley Research Center; and Purdue Univ., Lafayette, Ind. School of Aeronautic, Astronautic and Engineering Sciences.
For primary bibliographic entry see Field 08B.
W71-10317

A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
Weather Bureau, El Paso, Tex; and Texas Univ., El Paso. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02B.
W71-10319

REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
Pennsylvania Dept. of Forests and Waters, Harrisburg. Water Resources Branch.
For primary bibliographic entry see Field 04A.
W71-10320

GENERATED MONTHLY STREAMFLOWS FOR THE MIDWESTERN AND SOUTHWESTERN UNITED STATES,
Houston Univ., Tex. Dept. of Civil Engineering; and Northwestern Univ., Evanston, Ill. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02E.
W71-10321

TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
Northeastern Univ., Boston, Mass. Dept. of Civil Engineering.
For primary bibliographic entry see Field 05B.
W71-10326

SIMULATION MODEL OF STREAM CAPTURE,
Virginia, Univ., Charlottesville. Dept. of Environmental Sciences.
For primary bibliographic entry see Field 02E.
W71-10337

IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (Identifikatsiya nelineynykh gidrologicheskikh sistem),
Gidrometeorologicheskii Nauchno-Issledovatelskii Tsentr, Leningrad (USSR).
For primary bibliographic entry see Field 02E.
W71-10342

DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
Stanford Univ., Calif.
For primary bibliographic entry see Field 08D.
W71-10406

6B. Evaluation Process

WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
North Carolina Univ., Chapel Hill. Dept. of City and Regional Planning; and North Carolina Univ., Chapel Hill. Dept. of Environmental Sciences and Engineering.
Maynard M. Hufschmidt, and Karl Elfer.
Available from the National Technical Information Service as PB-201 053, $6.00 paper copy, $0.95 in microfiche. Completion Report, January, 1971, 318p, 33 fig, 12 tab, 144 ref, 5 append. OWRR Project C - 1159 (No. 1592) (1)

Descriptors: *Planning, *Cities, *Water resources development, *Urbanization, Water demand, *Model studies, Systems analysis, *Evaluation, Estimated costs, Estimated benefits, Management, Administration, Wisconsin, Maryland, North Carolina.
Identifiers: *Planning models, Baltimore (Md).

Water resource planning theory and practice in the United States are examined in terms of their suitability to deal with current and future urban-metropolitan water resource problems and needs. The hypothesis that current theory and practice are inadequate to this end is examined by analysis of current planning methodology and of water resource planning experience in selected U.S. metropolitan areas. An adapted water resource planning model is developed for specific use in urban-metropolitan areas, and its application is examined in general terms to U.S. water resource planning during the 1970's and, specifically, to the situations in three metropolitan areas: The Research Triangle Region of North Carolina, Baltimore, and Southeastern Wisconsin. Brief analyses of water resource planning problems in the North Carolina Piedmont Crescent, Southeast England, and Tokyo, Japan, urbanizing areas serve to give an international perspective to the applica bility of the model. The implications of the research and analysis for water resource policy and administration in

the United States are presented via a set of findings and a list of specific recommendations for action to be taken by federal, state, and local governments to improve urban-metropolitan water resource planning and management.
W71-09932

LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT: THEORY AND PRELIMINARY RESEARCH DESIGN,
Oklahoma State Univ., Stillwater, Dept. of Economics.
Larkin Warner.
Available from the National Technical Information Service as PB-201 602, $3.00 in paper copy, $0.95 in microfiche. Oklahoma State University, Water Resources Research Institute Research Project Technical Completion Report, February 1971. 33 p, 5 fig, 49 ref, append. OWRR Project A-020-OKLA (1).

Descriptors: *Water resources development, *Oklahoma, *Navigation, *Canals, *Land tenure, Economics, Land resources, Land development, Land management, Land use, Urbanization, Land appraisal, Legal aspects, Real property, Water rights.
Identifiers: *Land value, *Arkansas River, *Tulsa (Okla).

The impact of the development of the Arkansas Waterway upon land tenure and land value was studied using a simple economic response model. It is essentially an extension of the microeconomic behavior of economic agents in space. Although some of the model's assumptions are unrealistic, an attempt is made to abstract from the key features of the real world patterns associated with the particular waterway development under study. Thus it is possible to assess alternative strategies for empirical tests of the model's hypotheses. (Knapp-USGS)
W71-09937

EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
Battelle, Memorial Inst., Columbus, Ohio. Columbus Labs.
Ira L. Whitman, Richard M. Davis, Seymour E. Goldstone, Lois Molholm, and Robin J. Milstead.
Available from the National Technical Information Service as PB-201 054, $3.00 in paper copy, $0.95 in microfiche. Battelle, Columbus Laboratories, Research Report to Office of Water Resources Research Contract Number 14-31-0001-3178, 92 pages, April 30, 1971, 8 fig. C-1914 (No. 3178) (1).

Descriptors: *Cities, *Water resources planning, *Urban sociology, *Social aspects, *Recreation, *Urbanization, *Evaluation, Regional analysis, Forecasting, Effluents, Water quality, Cost-benefit analysis.
Identifiers: Education, Housing, Crime, Land values, Cleveland (Ohio), *Urban core usage.

This research effort focused primarily on the relationship between water resources and social qualities of urban core areas. Among the subjects specifically covered were inner city water-related recreation, education, housing, crime, and the relationship between urban water resources and land values. The Cleveland Metropolitan Area was found to be typical of large urban areas, and thus was used as a case study for this research. Cleveland's water resources include the Lake Erie waterfront and three small rivers, around which the region's major park system is designed. In relation to inner city water-related recreation, it was found that under the present set of institutional and legal constraints recreation agencies would be unable to implement new procedures in recreation planning for the purpose of providing more equitable recreation opportunities to the residents of the inner city. A strategy for introducing new recreation planning methods in the Cleveland systems was recommended. The broad subject of 'social quality' as it may relate to urban water development was defined and conceptualized. It was concluded that attitudes on the relationship in our society between social quality and urban water development must be understood in order to form a basis for developing water resources for the benefit of the urban core citizen. (Whitman, Battelle Institute-Columbus Laboratories)
W71-09940

PLANNING ANALYSIS FOR THE NON-MARKET VALUES OF WATER RESOURCES WITH PARTICULAR EMPHASIS ON RECREATION,
Cornell Univ., Ithaca, N.Y. Water Resources and Marine Sciences Center.
Robert J. Kalter.
Technical Report No. 27, March, 1971, 4 p, 9 ref. OWRR Project B-014-NY (1).

Descriptors: *Recreation, *Recreation demands, *Economic impact, *Income, Economics, Welfare (Economics), Planning, Forecasting, Evaluation, Water allocation (Policy).
Identifiers: *Spartial allocation, Income distribution.

To provide an improved basis for investments in water-based recreational facilities, public decision makers need appropriate methodology and associated data to analyze the economic aspects of such decisions. This project dealt with several diverse phases of this issue. First, market oriented recreation demand functions for specific activities were derived from national recreation survey data. These functions were utilized to develop procedures for projecting recreation demand, estimating associated economic benefits and analyzing the effects of a policy of public pricing for recreational facilities. Second, a spatial allocation model, along linear programming solution lines, was formulated to show the relationship between recreation demand and supply. Both the allocation model and the demand functions were used for projection purposes in areas of New York State. Third, a study estimating the effects of public outdoor recreation programs in New York State on the distribution of personal income was carried out. Finally, a study of the regional economic impact of outdoor recreation on a five county region surrounding one of New York's Finger Lakes was completed. The results of several previous phases of this project was utilized as a data base for this undertaking.
W71-09944

PROCEEDINGS OF TWENTY-FOURTH ANNUAL NEVADA WATER CONFERENCE.

24th Annual Nevada Water Conference Proceedings, Nevada Division of Water Resources and Nevada State Reclamation Association, September 24-25, 1970, Carson City, 1970. 131 p.

Descriptors: *Nevada, *Water resources development, *Planning, Hydrogeology, River Basin development, Groundwater, Surface waters, Water pollution control, Water supply.
Identifiers: *Nevada Water Conference.

The 24th Annual Nevada Water Conference concentrated on the subjects of water resources planning, water development, and environmental protection. Topics discussed included water importation, Nevada's water plan, runoff estimation, the impact of mining, open spaces policy, land law, desalting, environmental effects of water distribution, flow tracing, and basin-wide planning approaches. In addition, the reports of the Nevada Department of Fish and Game, the Army Corps of Engineers, the College of Agriculture of Nevada Univ., Bureau of Reclamation, Soil Conservation Service, Bureau of Environmental Health, Desert Research Institute, Bureau of Land Management, and Colorado River Commission were presented. (Knapp-USGS)
W71-09951

MANAGEMENT STUDY OF A TRANSITIONAL DELTA SYSTEM,
STORM Engineering Design, San Rafael, Calif.
For primary bibliographic entry see Field 04A.
W71-10057

A DYNAMIC PROGRAMMING ALGORITHM FOR THE OPERATION OF THE GREAT LAKES,
Department of Energy, Mines and Resources, Ottawa (Ontario). Inland Waters Branch.
R. L. Pentland, and N. E. Eryuzlu.
Reprint Series No 53, 1969. 25 p, 6 ref.

Descriptors: *Great Lakes, *Regulation, *Dynamic programming, *Computer programs, Methodology, Economics, Operations research, Optimization, Mathematical studies, Benefits, Economic efficiency, Planning, Evaluation, Economic impact, Economic prediction, Feasibility studies.
Identifiers: Great Lakes regulation studies.

A dynamic programming algorithm was developed to facilitate operating policies pertinent to ecological and economic management of the Great Lakes by Canada and United States. Variations in lake levels and outflows affect a great diversity of interests, including hydro-electric power, navigation, water supply, and recreation. The magnitude of the problem requires an introduction of short cuts and approximations reducing computing costs to reasonable proportions. The discussions are limited to the first stage of investigations, that is, maximization of economic benefits assuming a foreknowledge of supplies. (Wilde-Wisconsin)
W71-10076

ATLANTA COASTAL REGION, MULTI AGENCY OIL AND HAZARDOUS MATERIALS, POLLUTION CONTINGENCY PLAN, REGION IV.
Coast Guard District (7th), Miami, Fla.
For primary bibliographic entry see Field 05G.
W71-10200

THE DETERMINATION OF POWER BENEFITS FROM A MULTIPURPOSE WATER PROJECT,
K. Chatikavanij, F. W. Patterson, and W. G. Lockett.
Engineering Journal of Can, Vol 53, No 12, p 21-27, Dec, 1970. 7 p, 5 fig.

Descriptors: *Project planning, *Multiple purpose projects, Hydrologic data, Water resources, Hydroelectric power, Benefits, Computer programs, *Benefit-cost analysis, Irrigation, Electric power production, Computer models, *Simulation, Streamflow, Decision making, River basin development.
Identifiers: Thailand, Yanhee Project (Thailand).

Water resource development in the broadest sense generates a wide variety of benefits. Some are simple positive additions to the economy, such as the generation of hydroelectric power, and supply of water for irrigation, industrial, and domestic use. Other benefits produced by sewage disposal and flood control schemes save the cost of pollution and flood damage. These benefits, and those relating to navigation and recreation, can be evaluated, some accurately and others only approximately. Comprehensive methods have evolved for optimizing the design of multipurpose water resource systems, with a view toward obtaining maximum benefits at the national or regional level. Such analyses normally would be sponsored by Government because the interests of the various sectors of the economy involved may conflict at times. The studies are examples of the use of simulation techniques to investigate various alternatives in the design and operation of water resource systems. The simulation approach was facilitated by high-speed electronic computers. The program is not self-optimizing and should be used primarily as a model of the system. The model demonstrates the effects of different conditions, and a cold appraisal of results is required to arrive at important decisions. (USBR)

W71-10383

BETTER SPECIFICATIONS FOR UNDERGROUND WORK,
Jacobs Associates, San Francisco, Calif.
J. D. Jacobs.
Paper, American Society of Civil Engineers, National Meeting on Water Resource Engineering, Phoenix, Ariz, Jan 1971. 16 p.

Descriptors: *Specifications, *Contract administration, Contracts, Contracting, *Underground powerplants, Underground openings, Change orders, Construction, Design modifications, Claims (Contracts), Bids, Overbreak, Payment, Supports, Drawings, *Tunnels.
Identifiers: Changed conditions.

Problems in contract specifications, particularly for large underground chambers, are discussed. To help produce contract specifications that will improve contractor-owner relations and reduce project costs by lower bids and fewer claims, several suggestions and conclusions are offered: (1) study alternatives and possible changes before the job is bid; (2) make specifications fair and equitable; (3) seek advice of experienced construction supervisors while writing specifications; (4) tailor every specification to the particular project; (5) use the changed conditions clause along with a frank statement of expected conditions; (6) provide a fair system for overbreak reimbursement; (7) permit the contractor a voice regarding temporary excavation supports; (8) provide for a technical committee to pass on matters of excavation supports; ( ) ensure that contract drawings do not predict physical conditions which may differ from those actually encountered; (10) give quantities of support items only for purposes of comparison of total bids; (11) do not predetermine unit bid prices; (12) settle extra work adjustment by negotiation, not by prestated formulae; (13) prequalification of bidders for large underground chambers is probably impractical. (USBR)
W71-10401

WELL TECHNOLOGY SERVES THE MINING INDUSTRY.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.
For primary bibliographic entry see Field 04B.
W71-10423

6C. Cost Allocation, Cost Sharing, Pricing/Repayment

RESEARCH IS GUIDE FOR ESTIMATING WELL COSTS.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.
For primary bibliographic entry see Field 08A.
W71-10424

6E. Water Law and Institutions

WELL REGULATIONS AND POLLUTION ABATEMENT.

California Public Resources Code Ann sees 3220 thru 3229 (West 1956).

Descriptors: *California, *Oil wells, *Water pollution, *Well regulations, Groundwater, Well casings, Pollution abatement, Water wells, Drilling, Well permits, Irrigation, Domestic water, Oil, Oil industry, Natural gas, Testing, Test procedures, Onsite tests, Water quality control, Water pollution sources, Water pollution control, Administrative agencies, Legislation, Permits, Legal aspects.

Water-tight and adequate metal casings shall be used on all wells producing oil or gas in order to prevent water pollution of both surface and underground waters suitable for irrigation or domestic purposes. Whenever it shall appear that water is becoming contaminated with oil or gas from a well, a shut-off test shall be ordered for the well. If results of the test are unsatisfactory, a second shut-off test may be ordered. Necessary remedial work shall be ordered to prevent further water pollution or damage to oil and gas deposits. Forms, procedures, and time requirements for the ordering of tests and remedial work are set forth. Every person producing oil or gas shall file a monthly statement of the amount of oil produced, the number of wells, and the disposition of gas produced during the month. Before abandoning any well, the owner shall take the steps necessary to protect waters against pollution from the infiltration of detrimental substances, and shall inform the proper authorities of such steps. (Smiljanich-Florida)
W71-09933

PLACER MINING WATER POLLUTION,
California Public Resources Code Annot sees 2551 thru 2559 (West 1956).

Descriptors: *California, *Placer mining, *Water pollution, *Pollution abatement, Mining, Water quality control, Water pollution sources, Water pollution effects, Pollutants, Dredging, Transportation, Streams, Watersheds (Basins), Permits, Adjudication procedure, State governments, Settling basins, Mine water, Mine wastes, Aluminum, Lime, Administrative agencies, Legislation, Legal aspects.
Identifiers: Public nuisance.

Any operator of a placer mine on any stream or on the watershed of any tributary of the Sacramento or San Joaquin Rivers, who does not hold a permit to operate from the California Debris Commission, shall supply the county in which the mine is situated with certain required information, including details of the mining operation. Precautions required to be taken to prevent water pollution include construction of settling ponds and mixture of certain chemicals with the mining effluent. Procedures are outlined for the transportation of dredgers across streams, along with penal provisions. Other remedies to abate water pollution from placer mining include injunctions to prevent a public nuisance and available civil actions. (Smiljanich-Florida)
W71-09934

OCEAN WATER-CONTACT SPORTS.

California Health and Safety Code Ann sees 24155 thru 24159 (West 1967).

Descriptors: *California, *Water sports, *Regulation, *Water pollution, Legislation, State governments, Legal aspects, Water law, Oceans, Environmental sanitation, Water quality, Bacteria, Water pollution sources, Bays, Standards, Recreation, Beaches, Water utilization, Safety.

A water contact sport is any sport where the body of the person comes into physical contact with water. Boating and fishing, are not included, but swimming, surfboarding, and water-skiing are included. The State Department of Public Health supervises sanitation, healthfulness, and safety of the public beaches and public water-contact sport areas of the ocean waters and bays of the state. The Department may make and enforce such rules and regulations as are deemed proper. These rules and regulations shall include suitable standards of safe bacteria count for water-contact sports areas specified by the state or regional water pollution control boards. Any violation of these rules and regulations is a misdemeanor. This article shall not be construed to give the Department of Public Health the authority to fix the areas wherein water-contact sports are allowed. (Johnson-Florida)
W71-09935

GRANTS FOR WATER POLLUTION CONTROL.
Code of Federal Regulations, Title 18, Chap V, part 601 (1970). 23 p.

Descriptors: *Water pollution control, *Grants, *Administrative agencies, *Regulation, Water pollution, Pollutants, Pollution abatement, Administrative decisions, Treatment facilities, Water treatment, Waste treatment, Discharge (Water), Storm drains, Storm runoff, Training, Financing, Administration, Federal government.

The first subpart of this regulation promulgated by the Federal Water Pollution Control Administration establishes uniform definitions of commonly-used words and procedures for allotment, amounts, and payments of federal funds to state agencies. Subpart B pertains to grants for construction of treatment works; definitions are promulgated, along with provisions for: (1) grant conditions; (2) assurances from applicants; (3) payments; (4) final settlement; and (5) criteria for considering propriety of federal aid. Grants for demonstration projects for the control of discharges from storm-water or combined sewer systems are regulated by subpart C; included are regulations governing: (1) applications for grants; (2) grant limitations; (3) grant conditions; (4) assurances from applicants; and (5) determining desirability of projects. Subpart D pertains to grants for research, training, and demonstration projects and is further divided into four areas: (1) applicability and definitions; (2) eligibility, award, and termination; (3) grant conditions; and (4) grantee accountability. Regulations for awards of research fellowships are contained in subpart E. (Hart-Florida)
W71-09939

INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
Huron River Watershed Council, Ann Arbor, Mich. Inland Lakes and Shoreland Project.
For primary bibliographic entry see Field 04A.
W71-09945

DOMESTIC WATER AND ICE.

Idaho Code, sees 37-2101 thru 37-2103 (1961).

Descriptors: *Idaho, *Ice, *Water supply, *Water pollution, Pollution abatement, Water pollution control, Water quality control, Water pollution sources, Chemicals, Bacteria, Domestic wastes, Industrial wastes, Water purification, Potable water, Public health, Water pollution treatment, Water quality, Standards, Domestic water, Legislation, Regulation, Legal aspects.
Identifiers: Penalties.

Ice manufactured or stored for human consumption shall be made from pure water, and shall be stored so as to prevent pollution of the ice from foreign matters. Ice manufactured or stored in violation of the statute shall be deemed polluted ice, unfit for human consumption, and prohibited from sale to the public. Pursuant to standards promulgated by the state board of health, any person maintaining a plant or system of water supply to the public shall keep the water free from all pollution, chemical or bacterial, in order to preserve the quality and safety of water and water supply systems. Violations of these requirements shall constitute a misdemeanor. (Smiljanich-Florida)
W71-09979

POLLUTION OF IRRIGATION WORKS, WATER SUPPLIES, AND WATER COURSES.

Idaho Code sees 18-4301, 18-5803, 18-5807, 18-7013 (1948).

Descriptors: *Idaho, *Water pollution, *Water supply, *Domestic water, Pollution abatement, Water pollution sources, Water pollution control,

Water quality, Potable water, Pollutants, Animal wastes (Wildlife), Farm wastes, Domestic wastes, Irrigation water, Rivers, Streams, Canals, Ditches, Reservoirs, Waste dumps, Waste disposal, State governments, Treatment facilities, Legislation, Legal aspects.

Interferences with ditches, canals, or reservoirs, including the dumping of waste materials into such conveyances, shall be unlawful. The dumping of the carcass of any dead animal or other animal wastes into any watercourse is prohibited, as is leaving any dead animal in the proximity of a stream or irrigation works so as to render the water unfit for domestic use. To prevent water pollution, whenever any structure maintained to store water for domestic purposes is wholly enclosed by a fence posted with warnings, it shall be unlawful for any person to throw any substance within the area enclosed without the permission of the owner. (Smiljanich-Florida)
W71-09983

CREATION OF THE STATE BOARD OF HEALTH.
Wyoming Statutes secs 35-10, 35-19 (1959).

Descriptors: *Wyoming, *Water pollution, *Pollution abatement, *Administrative agencies, Water quality control, Water pollution control, Water pollution sources, Water supply, Sewage disposal, Sewage treatment, Municipal wastes, Industrial wastes, Environmental sanitation, Regulation, Administration, Adjudication procedure, Legislation, Legal aspects, Public health, Water pollution treatment, State governments.

The State Board of Health is hereby created, to be composed of five members, whose qualifications are set forth. Members shall serve for staggered six year terms. Provisions are made for appointment of officers, regularity of meetings, compensation of members, and procedures to be followed. The Board is authorized to investigate the pollution of streams and natural waters and to investigate all water works and water systems to determine the sanitary and economic effects of such pollution. The Board is also authorized to conduct experiments to determine the existence of pollution, and to institute proceedings to abate water pollution. (Smiljanich-Florida)
W71-09988

WATER USE ACT.
Alaska Statutes secs 46.15.010 thru 46.15.270 (1966).

Descriptors: *Alaska, *Appropriation, *Beneficial use, *Water utilization, Prior appropriation, Adjudication procedure, Administrative agencies, Diversion, Permits, Priorities, Unappropriated water, Public rights, Water law, Legal aspects, Legislation, Water pollution, Water pollution control, Water users, Water rights.

The Department of Natural Resources is granted authority to determine and adjudicate rights in all state waters. Waters occurring in a natural state are reserved to the people, subject to appropriation and beneficial use. The Act sets out the criteria and procedure for obtaining a permit to appropriate water, along with the rights of prior appropriators. Violation of appropriation statutes and regulations is declared a misdemeanor. The Act establishes a Water Resources Board, whose function is to advise the governor on all water use and appropriation matters, including the prevention of pollution. (Madsen-Florida)
W71-10067

WATER POLLUTION CONTROL ACT.
Alaska Statutes secs 46.05.010 thru 46.05.240 (1966).

Descriptors: *Alaska, *Legislation, *Water pollution control, *Public health, Non-structural alternatives, Water quality control, Impaired water quality, Pollution abatement, Standards, Sewage disposal, Human population, Industrial use (Water), Permits.

This Act vests in the Department of Health and Welfare the authority to abate and prevent pollution. The key provision of the Act declares that no person or legally recognized entity may pollute or add to the pollution of any body of surface or underground water, natural or artificial, public or private, inland or coastal, fresh or salt, which is within or contiguous with the state's border. Pollution is described as contamination of water in a manner which creates a nuisance, or makes water unclear, noxious, impure, or unfit so that the waters are actually or potentially harmful or detrimental to the public health, to fish and animals, or to domestic, commercial, industrial, or recreational use. The Department has the authority to set water standards which are, as a matter of express public policy, consistent with public health, wildlife conservation and industrial development. Injunctive relief may be sought against individuals acting in contravention of an order or determination of the Department. Willful violators are guilty of a misdemeaner and may be fined, imprisoned, or both, for each separate violation of the act. (Kohla-Florida)
W71-10068

WATER POLLUTION--PROTECTION FROM.
Revised Code of Washington Ann, secs 35.88.010 thru 35.88.090 (1965).

Descriptors: *Washington, *Water pollution control, *Water supply, *Public health, Water pollution sources, Water pollution treatment, Cities, Local governments, Water sources, Water storage, Water purification, Water treatment, Impaired water quality, Pollutants, Path of pollutants, Legislation, Administration, Remedies, Public utilities.

To protect the water supply of their inhabitants, cities and towns are given jurisdiction over all property occupied by those structures that convey and store water and over all sources of supply, whether within or without the city limits. Each city may enact ordinances prescribing what acts are offenses subject to penalty or punishment. Special police shall enforce these ordinances. Pollution is declared to be a nuisance and must be abated: (1) punishment for creating a nuisance may be a fine of up to $500; (2) a failure by the violator to abate the nuisance upon a court order subjects him to the court's costs in abating it; and (3) the city may seek a permanent injunction against such nuisances. Upon investigation of infractions, the mayor and city health officers are directed to enforce this act by arrest and prosecution of violators. Special provisions are made for inland cities over 100,000 prohibiting the discharge of sewage into water supplies and directing the periodic inspection of disposal systems by the director of health. (Rees-Florida)
W71-10071

CONSERVATION COMMITTEE TO PREVENT POLLUTION OF WATERS BY OIL INDUSTRY.
Revised Code of Washington Ann secs 78.52.020, 78.52.160 (1962).

Descriptors: *Washington, *Oil industry, *Water pollution, *Water pollution control, Oil, Oil wells, Oil wastes, Saline water intrusion, Water pollution sources, Legal aspects, Water law, Legislation, Administrative agencies, Administration.

An oil and gas conservation committee is created by this Act. The authority of this committee with respect to water pollution control includes: (1) requiring that drilling, casing, operating and plugging of oil and gas wells be done so as to prevent pollution of fresh water supplies by oil, gas, or salt water; and (2) requiring surety bonds to insure the sealing of each dry or abandoned well. (Madsen-Florida)
W71-10073

PUBLIC HEALTH--POLLUTION OF WATER SUPPLY PROSCRIBED.
Revised Code of Washington Ann secs 70.54.010 thru 70.54.040 (1962).

Descriptors: *Washington, *Water quality control, *Water pollution control, *Public health, Wells, Springs, Streams, Rivers, Lakes, Water pollution, Water pollution sources, Water works, Municipal water, Watersheds (Basins), Legal aspects, Water law, Legislation.

Proscribed and made punishable by these sections are: (1) the pollution of any spring, well, stream, river, or lake used or fit to be used for human consumption; (2) the pollution of the watershed of a municipality in an adjoining state; and (3) knowing distribution of impure water for public or private use. The state commissioner of health is given the duty, upon request, of advising city and county officials on sanitary and water quality matters. (Madsen-Florida)
W71-10074

NUISANCE (WATER POLLUTION).
Revised Code of Washington Ann secs 9.66.010 thru 9.66.050 (1961).

Descriptors: *Washington, *Pollution abatement, *Water pollution, *Remedies, Water pollution control, Water pollution sources, Water quality, Water quality control, Public health, Public rights, Transportation, Navigable waters, Lakes, Streams, Navigable rivers, Waste disposal, Waste dumps, Legislation, Adjudication procedure, Legal aspects.
Identifiers: *Public nuisance, Penalties.

Any act or omission which shall pollute or obstruct a lake or navigable watercourse shall be a public nuisance. Where no specific punishment is otherwise prescribed by law, a public nuisance shall be considered a misdemeanor. With certain exceptions, any judicial officer may order abatement of the nuisance in addition to fine or punishment. It shall be a gross misdemeanor to deposit, leave, or keep any unwholesome substance or to maintain any business detrimental to the public health on or near a watercourse of public travel. (Smiljanich-Florida)
W71-10078

POLLUTION OF AQUATIC HABITATS.

California Fish and Game Code Ann, secs 5650 thru 5802 (West 1958). 6 p.

Descriptors: *California, *Water pollution, *Pollutant identification, *Mining, State governments, Legislation, Legal aspects, Abatement, Pollution abatement, Water pollution control, Pollutants, Wastes, Water pollution sources, Public health, Water quality, Regulation, Water policy, Water rights, Hydraulic mining, Mine wastes.

Regulations make it unlawful to deposit in, permit to pass into, or place where it can pass into the waters of the state any of a list of specific materials. Whenever the Department of Fish and Game determines that a continuing and chronic condition of pollution exists, it shall report such condition to the appropriate regional water pollution control board and work with the board to correct the condition. The Department of Public Health may examine shellfish areas and determine whether such an area is so contaminated by sewage that the taking of shellfish therefrom may constitute a threat to the lives or health of human beings; it is unlawful to take shellfish from an area determined to be a menace to human health. It is unlawful to conduct any mining operations in the Trinity and Klamath River Fish and Game District during certain periods. It is also unlawful to pollute, muddy, contaminate, or soil the waters of this district or to operate a hydraulic mine that effects these waters.

Any structure that contributes to prohibited conditions in the district is a public nuisance. (Johnson-Florida)
W71-10081

DISCHARGES INTO CERTAIN WATERS.
California Harbors and Navigation Code Ann secs 133, 134 (West 1955).

Descriptors: *California, *Water quality control, *Oil wastes, *Wood wastes, Legislation, Legal aspects, Regulation, Water law, Water pollution control, State governments, Oil, Water pollution sources, Wastes, Pollutants, Pollutant identification, Waste disposal, Waste storage, Navigable waters, Ships, Bays.

Except in case of emergency imperiling life or property, or unavoidable accident, collision, or stranding, or as otherwise permitted by law, it constitutes a misdemeanor for any person to discharge, or suffer the discharge of oil by any methods, means, or manner, into or upon the navigable waters of the state of California from any vessel using oil as fuel for the generation of propulsion power, or any vessel carrying or having oil in excess of that necessary for its lubricating or lawful requirements. The term 'oil' means oil of any kind or in any form. Every person who throws, deposits, or permits another in his employ to throw or deposit, any sawdust, slabs, or refuse lumber, in any place where it may be carried or fall into the waters of Humboldt Bay, without first having constructed piers, bulkheads, dams, or other contrivances, approved by the board of supervisors of Humboldt County, to prevent their escape into the channels of the bay, is guilty of a misdemeanor. (Johnson-Florida)
W71-10085

CORPORATIONS TO STORE SALT WATER,
Texas Civil Statutes Ann, art 7572 thru 7574 (1954).

Descriptors: *Texas, *Water pollution sources, *Saline water-freshwater interfaces, *Oil fields, Oil industry, Drilling, Oil wastes, Oily water, Oil-water interfaces, Salts, Saline soils, Streams, Irrigation, Irrigation water, Organizations, Condemnation, Water storage, Water utilization, Canals, Pipes, Reservoirs, Pumping, Water pollution treatment, Stream improvement.

Corporations may be created to gather, store, and impound water containing salt or other impurities produced in the drilling and operation of oil and other wells, and to prevent the flow thereof into streams being used for irrigation. These corporations may exercise several rights, including: (1) the ownership and operation of ditches, pipe lines, levees, and reservoirs for gathering and storing this water, and for the protection of such reservoirs from damage by surface waters; (2) the power to condemn lands; and (3) the right to cross with their ditches pipe lines under highways, railroads, logging roads, or canals, so long as use of these facilities remains impaired only for a reasonably necessary period. Such corporations shall also serve all producers of such waters in the gathering, impounding, and storage of these waters in proportion to the needs of such producers. Such service shall be provided at a fair and reasonable charge without discrimination between producers. (Rees-Florida)
W71-10097

STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
Missouri Univ., Columbia.
For primary bibliographic entry see Field 05C.
W71-10103

POLLUTION OF THE HIGH SEAS RESULTING FROM DRILLING AND PRODUCING OPERATIONS--FEDERAL JURISDICTION AND OPERATOR LIABILITY,
For primary bibliographic entry see Field 05G.
W71-10112

MISSOURI RIVER BASIN WATER QUALITY STANDARDS.
Missouri Water Pollution Board, Jefferson City.
For primary bibliographic entry see Field 05G.
W71-10113

SOLID WASTE DISPOSAL STANDARDS.
Wisconsin Natural Resources Board, Madison.
For primary bibliographic entry see Field 05G.
W71-10114

RULES FOR THE PREVENTION AND CONTROL OF OIL POLLUTION IN THE WATERS OF THE COMMONWEALTH.
Massachusetts Div. of Water Pollution Control, Boston.
For primary bibliographic entry see Field 05G.
W71-10115

BASIN REGULATIONS--WATER QUALITY (WATER QUALITY STANDARDS, ABATEMENT, AND ENFORCEMENT PROCEDURES).
Delaware River Basin Commission, Trenton, N. J.
For primary bibliographic entry see Field 05G.
W71-10116

WATER POLLUTION CONTROL LAWS.
Washington Dept. of Ecology, Olympia.
For primary bibliographic entry see Field 05G.
W71-10117

ENVIRONMENTAL LAW: NEW LEGAL CONCEPTS IN THE ANTIPOLLUTION FIGHT,
For primary bibliographic entry see Field 05G.
W71-10118

WATER QUALITY STANDARDS FOR WATERS OF INDIANA.
Indiana Stream Pollution Control Board, Indianapolis.
For primary bibliographic entry see Field 05G.
W71-10119

REGULATIONS GOVERNING THE USE OF WATER RESOURCES AND PUBLIC SUBAQUEOUS LANDS.
Delaware Water and Air Resources Commission, Dover.

1969. 34 p, 1 fig, 2 tab.

Descriptors: *Delaware, *Well regulation, *Beds, *Water utilization, Water pollution, Regulation, Control, Inspection, Permits, Well permits, Administrative agencies, Drilling, Subsurface waters, Well spacing, Wells, Drawdown, Drill holes, Drilling, Pipes, Pumping, Pumps, Well casings, Water table, Water pollution control.

The policy governing Water and Air Resources Commission actions is stated to be: (1) the development, utilization, and control of water resources and public subaqueous lands so as to make the maximum contribution to the public benefit, and (2) the control of the development and use of water resources and subaqueous lands so as to effectuate full utilization, conservation, and protection of such resources. The administrative principles governing the Commission's actions are set forth to comply with the stated governing policy. Comprehensive and detailed regulation of the installation, use, and abandonment of water wells under close commission control is established. A Water Well Contractors Licensing Board is established under the Commission to control membership and work quality of well contractors in Delaware. Finally, regulations are established for the use, leasing, and sale of public and private subaqueous lands, with emphasis on the Commission's ability to achieve the policy goals of water conservation when dealing with subaqueous lands. (Horwitz-Florida)
W71-10120

WATER QUALITY CONTROL ACT.
California Water Code Ann, secs 13000, 13001, 13002, 13020 (West 1971).

Descriptors: *California, *Water resources development, *Water quality control, *Water quality, Reasonable use, Legislation, State governments, Planning, Legal aspects, Regulation, Water resources, Rejoins, Watersheds (Basins), Water conservation, Economics, Water control, Water pollution control, Social values.

The legislature of California finds and declares that the people of the state have a primary interest in the conservation, control, and utilization of the water resources of the state, and that the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state. The legislature further finds and declares that activities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, and that state control can be most effectively administered on a regional basis. It is the intent of the legislature that primary responsibility for the coordination and control of water quality be with the state board and each regional board. Specific powers and rights are unaffected by any provision of this division or any ruling of the state on a regional board. This division shall be known as the Porter-Cologne Water Quality Control Act. (Johnson-Florida)
W71-10121

DEFINITIONS UNDER STATE WATER QUALITY ACT.
California Water Code Ann, sec 13050 (West 1971).

Descriptors: *California, *Water Quality Act, *Water pollution control, Water allocation (Policy), Water resources development, Water pollution sources, Water purification, Wastes, Waste treatment, Waste disposal, Water reuse, Reclamation (Waste water), Water conservation, Water treatment, Water users, Agriculture, Farm wastes.

This section of the Water Code lists the definitions used in California's Water Quality Act. Regional boards administer the program. Persons under the board's jurisdiction include private organizations and corporations, as well as cities, counties, and agencies of the state and the United States when authorized by federal law. All waters of the state, surface or underground, are covered by the Act, which seeks to promote beneficial uses of these waters. Such uses include domestic, municipal, agricultural, industrial, and recreational. The control of wastes extends to sewage and other substances associated with human habitation, manufacturing, producing, or processing. The water quality control plan is threefold: (1) to protect beneficial uses, (2) to maintain water quality objectives and (3) to provide a program of implementation. Contaminants, polltutants, and nuisances are defined. The Act excludes from waters of the state irrigation waters containing chemicals and fertilizers. Agricultural operations are not required to file reports of waste discharges with the regional boards. Since agricultural operations are not issued waste discharge requirements, they are outside the jurisdiction of the regional boards. Thus the Act encourages the growth and stability of irrigation farming. (Rees-Florida)
W71-10122

STATE WATER QUALITY CONTROL.
California Water Code Ann, secs 13100, 13120 thru 13169 (West 1971).

Descriptors: *California, *Water Quality Act, *Administration, *Standards, Water quality control, Water pollution control, Water policy, Regulation, Water conservation, Water resources development, Permits, Planning, Political aspects, Federal government, State governments, Local governments, Inter-agency cooperation, Commissions, Legislation, Statutes, Cost comparisons, Cost allocation.
Identifiers: *California Water Plan.

These sections of the California statutes provide for the creation of a state Water Resources Control Board, a Water Quality Advisory Committee, and regional quality control boards; they also outline the powers and duties of the Board. The Advisory Committee's function is to advise the Board upon regional problems and technical matters; its members are the nine regional board chairmen and nine appointees of the governor who are qualified in specialized fields. The Board is directed to formulate a statewide policy for water quality control. This state policy plus regional plans for water quality comprise the California Water Plan when reported to the Legislature during any session. This state policy shall consist of: (1) guidelines for long-range planning and management of surface and groundwater, (2) water resources development projects, and (3) quality control plans for interstate and coastal waters. Formulation of such policy must be preceded by public hearing and notice. The duties of the state Board are to: (1) to serve as the state water pollution control agency, (2) determine annual needs for research and recommend projects, (3) conduct research, (4) coordinate and evaluate investigations and recommendations, (5) formulate operational procedures for regional boards, (6) implement data storage and retrieval programs, (7) provide a public information program, and (8) regulate oil cleanup activities. (Rees-Florida)
W71-10123

STATE WATER QUALITY CONTROL FUND.

California Water Code Ann, secs 13400 thru 13442 (West 1971). 8 p.

Descriptors: *California, *Treatment facilities, *Financing, *Construction costs, Waste treatment, Water treatment, Waste water treatment, Loans, Financial feasibility, Government finance, Interest, Principal, Investigations, Planning, Legislation, Water resources development, Abatement, Grants, State government.

The California Water Quality Control Fund is to be continued. It makes funds available to political subdivisions within the state for construction of: (1) facilities for the collection, treatment, or export of waste when necessary to prevent water pollution, or (2) facilities to reclaim waste waters and convey reclaimed water. A public agency seeking funds must show: (1) the necessity for the proposed facilities, (2) that funds of the public agency are not available for financing such facilities, and (3) that the sale of revenue or general obligation bonds through private financial institutions is impossible or would impose an unreasonable burden on the public agency. Money granted from the fund is in the form of a loan, and the voters in the constituency must approve the loan agreement. Loans may also be made to pay for not more than one-half of the cost of studies and investigations made by such public agencies in connection with waste water reclamation. An abatement and cleanup account in the fund provides for outright grants to public agencies to clean up a waste or abate the effects thereof on the waters of the state. This account is funded by appropriations of the legislature and criminal and civil penalties for water pollution. (Johnson-Florida)
W71-10124

REGIONAL WATER QUALITY CONTROL.
California Water Code secs 13200 thru 13269 (West 1971)

Descriptors: *California, *Water quality control, *Waste disposal, *Water policy, Legislation, Planning, Coordination, Reasonable use, Regions, Water pollution, Basins, Technology, Geographical regions, Pollution abatement, Administration, State government, Regulation, Water districts.

California is divided into nine water quality control regions. With respect to its region, each board shall: (1) obtain coordinated action in water quality control, (2) encourage and assist in self-policing waste disposal programs, (3) require state and local agencies to investigate and report on any technical factors involved in water quality control, (4) request enforcement of water quality control laws by appropriate agencies, (5) and encourage regional planning and action for water quality control. The boards shall formulate and adopt water quality control plans for all areas within their region, conforming the plans to state policies. The water quality objectives of such plans should ensure the reasonable protection of beneficial uses and the prevention of nuisance. Any person discharging or proposing to discharge waste that could effect water quality within any region shall file a report of that discharge and of any subsequent activity materially changing the character, location, or volume of a discharge. Boards shall prescribe requirements as to the nature of any discharge in accordance with changing conditions in the disposal area or receiving waters. (Johnson-Florida)
W71-10125

ENFORCEMENT AND IMPLEMENTATION OF WATER QUALITY STANDARDS.
California Water Code Ann, secs 13300 thru 13361 (West 1971). 17 P.

Descriptors: *California, *Water quality control, *Water pollution, *Abatement, Water quality, Public health, Water resources development, Planning, Legislation, Regulation, Water policy, State governments, Water districts, Legal aspects, Jurisdiction, Judicial decisions, Administration, Administrative agencies, Administrative decisions.

Whenever a regional water quality control board finds that a discharge of waste is taking place or threatening to take place in violation of prescribed requirements or discharge prohibitions, the board may issue a cease and desist order and direct compliance with the requirements. Any person discharging waste in violation of a requirement, order, or determination by the board that a condition of pollution or nuisance exists shall be liable for cleanup or the cost of governmental cleanup. Any aggrieved person may petition the state board to review an action by the regional board and then may petition the superior court for review. Upon failure to comply with a cease and desist order of a regional or state board, an injunction may be issued against the party. A regional board may seek an injunction in emergency situations when a discharge of waste threatens the public health. Any person who intentionally or negligently violates any cease and desist order may be civilly liable for up to six thousand dollars for each day of violation. (Johnson-Florida)
W71-10126

WATER RECLAMATION.
California Water Code Ann secs 13500 thru 13541 (West 1971).

Descriptors: *California, *Water reuse, *Reclaimed water, *Waste water treatment, Legislation, Legal aspects, State governments, Government finance, Administration, Administrative agencies, Administrative decisions, Financing, Loans, Water pollution, Water pollution control, Water policy, Water purification, Water quality, Water quality control, Reclamation, Water utilization, Waste treatment.

All possible steps shall be taken to encourage water reclamation. Loans may be made to implement reclamation. Statewide reclamation criteria for each use of reclaimed water shall be established by the Department of Public Health. Contamination resulting from use of reclaimed water shall be abated. Reports of use of reclaimed water are required, and requirements for these reports are specified. Regional boards shall prescribe water reclamation requirements if necessary. In the administration of the financial assistance program consideration shall be given water control facilities providing optimum water reclamation. The department must also conduct surveys and investigations regarding reclamation of water from waste. No waste well shall be used to discharge waste into a stratum used as a domestic water supply unless it is first determined, after public hearing, that it will not impair water quality. Violations of these provisions constitute misdemeanors. The Attorney General, if requested by a regional board, shall petition for a temporary restraining order, temporary injunction, or permanent injunction requiring offenders to comply with these provisions. (Robinson-Florida)
W71-10127

DISCHARGES FROM HOUSEBOATS ON OR IN THE WATERS OF THE STATE.
California Water Code Ann secs 13900 thru 13908 (West 1971).

Descriptors: *California, *Waste water (Pollution), *Water pollution control, *Administrative decisions, Legislation, Legal aspects, Cities, Local governments, State governments, Waste water disposal, Waste disposal, Wastes, Water pollution, Water policy, Pollution abatement, Water resources, Administration, Administrative agencies.

Regional boards shall determine if there are any areas in which discharges of waste from houseboats are inadequately regulated by local ordinance. Regional boards shall notify such areas and recommend provisions for the control of such discharges. Cities or counties shall adopt ordinances regulating such discharges of wastes. If a city or a county fails to adopt adeguate ordinances, the regional board may adopt regulations for the area. Any action or non action of a regional board may be reviewed by the state board and shall be reviewed at the request of any affected city or county. Nothing in this chapter shall constitute a limitation on the power of a city or county to adopt additional ordinances not in conflict with this chapter imposing further restrictions on the discharge of wastes from houseboats. (Robinson-Florida)
W71-10128

SPECIAL WATER QUALITY PROVISIONS.
California Water Code Ann secs 13950 thru 13951 (West 1971).

Descriptors: *California, *Water quality control, *Sewers, *Waste water treatment, Legislation, Legal aspects, Water quality, Water purification, Water pollution, Water pollution control, Water policy, Watersheds (Basins), Sewage disposal, Sewage treatment, Waste disposal, Cesspools, Environmental sanitation, Septic tanks, Waste water disposal, Wastes.

If any area of any district in the Lake Tahoe Basin provides a sewer system and treatment facilities sufficient to handle and treat any resultant waste, along with transportation facilities sufficient to transport resulting effluent outside the basin, then the further use of cesspools or other means of waste disposal is a public nuisance. Such district shall require all buildings to be connected with the sewer system within a period of not less than 90 days. On or after January 1, 1972, waste from within the Lake Tahoe watershed shall be placed in sewer systems and treatment facilities only. Such waste may be placed in holding tanks until it can be transported to treatment facilities. Use of cesspools, Septic tanks, or other means of waste disposal after January 1, 1972, shall be a public nuisance. Occupying a building which discharges waste in violation

of this section is a public nuisance, and actions may be brought to enjoin such occupants. If the regional board of the Lahontan Region finds that the operation of septic tanks and cesspools will not affect water quality and that sewering would damage the environment, then this section shall not apply. (Robinson-Florida)
W71-10129

CLEAN WATER BOND LAW OF 1970.
California Water Code Ann secs 13970 thru 13983 (West 1971).

Descriptors: *California, *Government finance, *Administrative agencies, *Water quality control, Legislation, Legal aspects, State governments, Regulation, Administration, Financing, Capital, Costs, Interest, Principal, Loans, Investment, Credit, Water quality, Water pollution, Water pollution control, Water policy.

The intent of this statute is to provide necessary funds to insure full participation by the state under section 8 of the Federal Water Pollution Control Act. The State General Obligation Bond Law is adopted for the issuance, sale, and repayment of bonds authorized by this chapter. A Clean Water Finance Committee is established and the membership is specified. This Committee can create a debt of $250,000,000 to establish a State Clean Water Fund. The purposes of the Fund are delineated. Such a bond issue shall be a general obligation of the state. Any money deposited in this Fund which requires repayment may be transfered to the General Fund, and, if transferred, it constitutes a reimbursement to the General Fund on account of interest and principal on bonds paid from the General Fund. Provisions for further appropriations are provided. The proper disposition of the proceeds from the sale of bonds is also specified. (Robinson-Florida)
W71-10130

TRANSPORTATION AND DISPOSAL OF WASTE.
California Water Code Ann secs 14000 thru 14100 (West 1971).

Descriptors: *California, *Waste water (Pollution), *Administrative agencies, *Water pollution control, Legislation, Legal aspects, Permits, Waste water disposal, Wastes, Waste disposal, Remedies, Administration, Adoption of practices, Water policy, Local government, State governments, Regulation, Water resources, Water quality, Water quality control, Water pollution, Pollution abatement, Pollutants, Transportation.

It is unlawful for any person to haul liquid waste without a registration issued by the State Water Resources Control Board. The required contents of the application for registration are enumerated, as are other actions required of the applicant and the state board. A fee schedule is also provided. Fees collected shall be deposited in the State Water Quality Control Fund. Each regional board shall approve sites for disposal of liquid wastes and adopt regulations for the disposal of such liquid wastes. No liquid wastes can be discharged into a community sewer system without the written approval of the operator of the system. The Attorney General, at the request of a regional board or the state board, shall petition for the issuance of a temporary restraining order, preliminary injunction, permanent injunction, or combination thereof prohibiting violation of this statute. Violation of this statute constitutes a misdemeanor. Nothing herein shall be interpreted to limit the power of any city or county to adopt equal or higher standards for liquid waste disposal wholly within their borders. (Robinson-Florida)
W71-10131

OCEAN POLLUTION MESSAGE,
Richard M. Nixon.

Address before the 91st Cong, 2d Sess, Oct 7, 1970, in Vol 28, No 41, Cong Q Weekly Report, p 2497-2498 (Oct 9, 1970).

Descriptors: *Oceans, *Waste dumps, *Legislation, *Federal government, Water pollution, Waste disposal, Waste water (Pollution), Environmental sanitation, Water pollution sources, Water pollution effects, Administrative agencies, Legal aspects, Water pollution control, Abatement, Pollution abatement, Water quality control, Regulation, Permits.

In this message to Congress, President Nixon speaks to the problem of ocean pollution, which he considers a serious threat to the environment. He also transmits to Congress a report on the Council on Environmental Quality, which concludes that the present level of ocean waste disposal is creating environmental damage and that the expected significant increase in dumping makes it imperative to seek alternate disposal methods and institutional solutions before the problem reaches greater proportions. The Council recommended, and the President plans to submit legislation to ban unregulated dumping of all materials in the ocean and prevent the dumping of harmful substances. The Administrator of the Environmental Protection Agency would be authorized to issue permits for the transportation and dumping of waste materials in the oceans and the Great Lakes. The President urges that action be taken before the problem is critical. (Liptak-Florida)
W71-10132

FINANCIAL RESPONSIBILITY FOR OIL POLLUTION CLEANUP.
Federal Maritime Commission, Washington, D.C.

Federal Register, Vol 36, No 36, p 3381-3383 (Feb 1971). 3 p.

Descriptors: *Water pollution control, *Oily water, *Damages, *Administrative decisions, Legislation, Regulation, Ships, Cleaning, Federal government, Administrative agencies, Legal aspects, Federal jurisdiction, Oil wastes, Oil, Pollution abatement, Administration, Pollutants, Water pollution, Water policy, Water quality, Water quality control.

Pursuant to the Federal Water Pollution Control Act, as amended by the Water Quality Improvement Act of 1970, the Secretary of the Federal Maritime Commission herein proposes amendments to Commission General Order 27, dealing with financial responsibility for oil pollution cleanup. It is proposed that the Order be amended to permit persons who acquire vessels for construction, scrapping or sale to apply for Master Certificates covering each vessel up to a specified maximum gross tonnage. The maximum gross tonnage would be the number of gross tons for which the applicant established financial responsibility. Another proposed change is that vessels need not have the Certificate on board but may have the Certificate number marked on the bow. Under the proposed amendment it is further proposed that it would no longer be necessary for all partners of a partnership to be named on any evidence of financial responsibility. Further amendments deal with changes in standard certification forms. (Robinson-Florida)
W71-10133

DISCHARGES OF OIL FOR RESEARCH, DEVELOPMENT AND DEMONSTRATION PURPOSES.
Environmental Protection Agency, Washington, D.C.

Federal Register, Vol 36, No 75, p 7326 (Apr 1971). 1 p.

Descriptors: *Research and development, *Administrative decisions, *Oil wastes, *Water pollution control, Federal government, Administration, Administrative agencies, Testing, Materials testing, Research equipment, Oil, Oily water, Water pollution sources, Water pollution, Regulation, Water pollution treatment.

Pursuant to Title 18 of the Code of Federal Regulations the Environmental Protection Agency (EPA) publishes guidelines to be followed in connection with research projects relating to the prevention, control, or abatement of oil pollution. Discharges of oil for research must be approved by the EPA. Persons requesting permission to discharge must show that the proposed discharge is in the public interest and that any results shall be available to the EPA. Applicants shall furnish a work plan which includes: (1) a description of the proposed site of discharge, (2) an assessment of possible environmental damage, (3) a description of materials involved, (4) a copy of notification to the Coast Guard, (5) contingency plans, (6) technical information, (7) provisions for technical documentation, and (8) concurrence of the appropriate state water pollution control agency. Required test administration procedures are as follows: (1) no discharge exceeding 1,000 gallons will be allowed, (2) applicants shall pay all costs, and (3) EPA representatives may accompany the applicant. The review by the EPA does not imply government endorsement or approval of the equipment, materials, or testing procedures used. Violation of these guidelines may subject the violator to the liabilities provided by the Federal Water Pollution Control Act. (Robinson-Florida)
W71-10134

ADMINISTRATIVE PROCEDURE (PERMITS FOR DISCHARGES OR DEPOSITS INTO NAVIGABLE WATERS).
Corps of Engineers, Washington, D.C.

Federal Register, Vol 36, No 67, p 6564-6570 (Apr 1971). 7 p.

Descriptors: *Administrative decisions, *Water pollution control, *Permits, *Waste disposal, Water quality control, Waste water (Pollution), Federal government, State governments, Administration, Administrative agencies, Regulation, Water pollution, Water quality, Legal aspects, Pollution abatement, Water policy, Water resources, Wastes, Water pollution sources, Waste water disposal.
Identifiers: *Refuse Act.

Pursuant to the Refuse Act the Secretary of the Army publishes these regulations pertaining to the issuance of permits for discharges or deposits into navigable waters. The regulations provide for cooperation in enforcement between the Department of the Army, Department of the Interior, Environmental Protection Agency, and the Department of Commerce. Provisions for resolving disagreements between these agencies are specified. Certain reasons for denying permits are also listed. Information required in applications for permits is specified. State certification may also be required. The procedures by which applications for permits are processed is also explained. Public notice and public hearings are required in deciding whether to grant permits. Environmental impact statements will not be required for discharges where the only impact will be on water quality standards, but such statements will be required if there is a significant environmental impact unrelated to water quality. Permits generally shall not extend beyond five years without revalidation. Permits shall be subject to such conditions as are deemed necessary by the appropriate federal agencies. (Robinson-Florida)
W71-10135

STANDARDS OF PERFORMANCE FOR MARINE SANITATION DEVICES.
Environmental Protection Agency, Washington, D.C.

Federal Register, Vol 36, No 92, p 8739-8740 (May 1971). 2 p.

Descriptors: *United States, *Treatment facilities, *Environmental sanitation, *Standards, Federal government, Legal aspects, Regulation, Boating regulations, Water quality control, Waste disposal, Sewage disposal, Waste treatment, Sewage, Sewage effluents, Sewage treatment, Water pollution, Water pollution sources, Technical feasibility, Analytical techniques, Water pollution control.

Terms to be used in applying the proposed standards for marine sanitation devices are defined. Such a device includes any equipment for installation on board a vessel and which is designed to receive, retain, treat, or discharge sewage. A device which will prevent the discharge of untreated or inadequately treated sewage is required. The sewage must not contain visible floating or settleable solids and the effluent must not contain excessive amounts of caliform bacteria, biochemical oxygen demand, or suspended solids. A state may make an application to the Environmental Protection Agency for a regulation completely prohibiting the discharge of sewage from any vessel into particular waters of the state. Current 'Standard Methods for the Examination of Water and Wastewater' shall be employed to determine the composition and quality of discharged effluent. In proposing these standards it is recognized that appropriate devices have not been developed for certain smaller classes of vessels; however, it is believed that such devices are capable of being developed before the effective date of the standards. (Johnson-Florida)
W71-10136

POLLUTION CONTROL FACILITIES--TAX EXEMPTIONS AND CREDITS.
Revised Code of Washington Ann, secs 82.34.010 thru 82.34.900 (Supp 1970).

Descriptors: *Washington, *Water pollution control, *Water pollution, *Taxes, Legal aspects, Water law, Legislation, Water quality, Water quality control, Pollution abatement, Water pollution treatment, Water conservation, Tax rate, Quality control, Water pollution treatment, Administrative agencies.

Air and water pollution facilities, as defined by this chapter, are exempted from sales and use taxes on their original acquisition. The owner may elect, in lieu of such exemption, a credit against future income taxes in the amount of the exemption, subject to conditions set out in the chapter. Application for tax relief certification is to be made to the state tax commission, which determines the cost of facilities and issues the certificate, subject to the approval of the state water pollution control commission. If a facility ceases to be operated primarily for the control of pollution, or if it no longer meets statutory pollution control standards, certification and future tax relief may, upon notice and hearing, be revoked. (Madsen-Florida)
W71-10137

WATER QUALITY CONTROL ACT.
Arizona Revised Statutes Ann secs 36-1851 thru 36-1868 (Supp 1970).

Descriptors: *Arizona, *Water pollution control, *Water quality control, *Administrative agencies, Water pollution, Legislation, Water law, Legal aspects, Water quality, Water rights, Water policy, State governments, Administration permits, Regulation, Water policy, Pollution abatement, Water resources, State governments, Environmental sanitation, Remedies.

The Department of Health is designated as the state water pollution control agency. A State Water Quality Control Council is established, and the statute specifies the membership, qualifications, terms, compensation, method of removal, organization, and procedure to be followed at meetings. The powers and duties of the Water Quality Control Council, Board of Health, and the Department of Health are also explained. The Council shall establish water quality standards, and criteria are listed to assist it in so doing. Absent a permit, it is unlawful for any person to pollute water, discharge polluting wastes into water, or discharge irrigation or drainage waters which reduce the water quality. Public hearings are required before water quality standards may be adopted, and hearing procedures are specified. Procedures for hearings on alleged violations are also explained. Violations of this legislation constitute misdemeanors and such violators may be enjoined. These provisions also apply to Indian lands. The purpose of this legislation is to provide additional remedies for the abatement of pollution, and it neither abridges nor alters any existing legal or equitable remedies. (Robinson-Florida)
W71-10138

SPECIAL TAX WRITE-OFF FOR POLLUTION CONTROL DEVICES.
Arizona Revised Statutes Ann, sec 43.123.02 (Supp 1970).

Descriptors: *Arizona, *Legislation, *Taxes, *Non-structural alternatives, Direct benefits, Pollution abatement, Equipment, Financing, Government finance, Treatment facilities, Water pollution, Water pollution sources, Abatement.

This section of the Arizona Statutes provides a tax benefit for pollution control. A taxpayer may, in lieu of a standard depreciation allowance, elect to amortize over a 60 month period the adjusted basis of any device, machinery, or equipment used in the collection and control of atmospheric and water pollutants and contaminants at their sources. The deduction is allowable once the subject equipment has been completed or acquired and placed in service. Adjusted basis is defined as only the amount properly attributable to the construction, reconstruction, remodeling, installation or acquisition of such device, machinery, or equipment, as certified by the state department of health. (Kohla-Florida)
W71-10139

CONSERVATION OF OIL AND GAS.
Arizona Revised Statutes Ann secs 27-501, 27-515, 27-516 (Supp 1970).

Descriptors: *Arizona, *Pollution abatement, *Contamination (Water), *Administration, Legislation, Oily water, Oil fields, Natural gas, Drilling, Regulation, Administrative agencies.

Title 27, chapter 4, article 1 of the Arizona Revised Statutes deals with production and conservation of oil and gas. Terms used in the article are defined. The Oil and Gas Conservation Commissioner is vested with such jurisdiction and authority over all persons and property as deemed necessary for administration and enforcement of all laws relating to conservation of oil and gas. The statute places an affirmative duty on the Commission to make and periodically amend all rules necessary for administration and enforcement of the Article. Eighteen mandatory subject areas for rules, regulations and orders are designated. A subpart of one of these areas provides that wells be drilled, cased, and plugged in a manner to prevent pollution of fresh water by oil, gas or salt water. A reasonable bond conditioned on performance of this duty is required. (Kohla-Florida)
W71-10140

POWERS AND DUTIES OF STATE CONSERVATION COMMISSION AND WATER RESOURCES BOARD.
Oklahoma Statutes Ann Title 82, secs 486, 1072 (1970).

Descriptors: *Oklahoma, *Administrative agencies, *Water pollution control, *Water resources development, Legislation, Water law, Legal aspects, Administration, Administrative decisions, Regulation, Water pollution, Erosion control, Flood control, Water storage, Water supply, Water resources, Water purification, Pollution abatement, Water utilization, Watershed management, Water quality, Water quality control, Environmental sanitation.

Powers of the Conservation Commission are listed and include, but are not limited to: (1) the control, storage, and preservation of all water which may be stored within the state; (2) the use, disposal, and sale of stored water within the state; (3) the control of rivers, creeks, ponds, and lakes for the prevention of damage to persons or property; and (4) the adoption and application of methods and means of purifying all water within its control and the prevention of pollution of any bodies of water within the state. The Oklahoma Water Resources Board shall have the authority to institute or to intervene in any actions before any board, court, commission, or officer of this or any state or of the United States to stop or prevent any use, misuse, appropriation, or pollution of any waters of the state in violation of any law, rule, regulation, order, judgment or decree of any court, board, commission, or officer of this or any state or of the United States. (Robinson-Florida)
W71-10141

DISPOSAL OF OIL WASTES.
Oklahoma Statutes Ann Title 52, secs 139 thru 145 (1969).

Descriptors: *Oklahoma, *Water pollution control, *Oil wastes, *Brine disposal, Regulation, Administration, Administrative agencies, Administrative decisions, Legislation, Legal aspects, Water law, Water pollution, Pollution abatement, Water policy, Pollutants, Brines, Natural gas, Oil fields, Chemical wastes, Industrial wastes, Saline water, Waste disposal, Waste water (Pollution), Waste water disposal.

Insofar as is reasonable and necessary to prevent the pollution of the surface and subsurface waters of the state, the Corporation Commission has the duty to make and enforce rules, regulations, and orders governing the handling, storage, and disposition of salt water, mineral brines, waste oil, and other deleterious substances used or produced in connection with the drilling or development of oil and gas. Unless necessary to prevent pollution the storage of deleterious substances in earthen ponds is not forbidden. The Commission shall receive assistance from the Oklahoma Water Resources Board and the Department of Wildlife Conservation. The violation of any rule, regulation, or order of the Commission authorized by this act shall constitute a misdemeanor. The provisions of this Act are supplemental to any and all other laws for the prevention of waters of the state. This Act is cumulative; no existing rights of property owners to file suits for damages shall be abridged or limited by this Act. (Robinson-Florida)
W71-10142

DISPOSAL OF OIL WASTES.
Oklahoma Statutes Ann, Title 52, secs 296, 309 thru 319 (1969) as amended (Supp 1970).

Descriptors: *Oklahoma, *Administrative agencies, *Water pollution control, *Well regulations, State governments, Administration, Administrative decisions, Legislation, Legal aspects, Water law, Water pollution, Water policy, Waste water disposal, Waste water (Pollution), Waste disposal, Wastes, Pollution abatement, Injection wells, Subsurface waters, Oil wells, Surface waters, Remedies, Saline water, Oil wastes, Natural gas.

No inflammable product from oil or gas wells shall be permitted in livestock water sources. All oil wastes shall be transported away or burned; they shall not be allowed to flow over the land. Owners shall not permit any well drilled for oil, gas, or salt water disposal through a workable coal seam to remain unplugged after it is no longer used. After notice and hearing the Corporation Commission may plug any gas, oil, injection, or disposal well causing water pollution or leaking deleterious sub-

stances upon the land if the owners cannot be found or are financially unable to plug the well. The Commission shall not be liable for such action, nor shall the Commission have assumed responsibility for remedial repair. The attempted remedy of such a condition shall not be an admission of liability. One who had no obligation to plug a well shall have a lien upon the interest of one who was so obligated. This statute constitutes a supplemental remedy. When the Commission undertakes remedial work it shall be done by contracts upon competitive bids. Any person who operates such a well shall furnish a corporate surety bond. (Robinson-Florida)
W71-10143

ENVIRONMENTAL QUALITY COMMISSION.
Oregon Revised Statutes, secs 449.001 thru 449.070 (1970).

Descriptors: *Oregon, *Water quality control, *Water pollution control, *Administrative agencies, Water pollution, Abatement, Pollution abatement, Public health, Municipal wastes, Industrial wastes, Wastes, Sewage, Sewage treatment, Legal aspects, Water law, Legislation.

The Department of Environmental Quality, consisting of the five-man Environmental Quality Commission, the department director, and their employees and assistants, is established by these sections. The Department is empowered to cooperate and contract with other state agencies, receive money from any source, issue subpoenas, administer oaths, and take depositions in carrying out its duty to administer and enforce state laws concerning environmental quality. The Commission may grant a municipality or industry a reasonable time to comply with one of the commission's orders, when it appears that immediate enforcement is not in the public interest. For this same purpose, the commission is authorized to intervene in abatement suits brought by other parties. (Madsem-Florida)
W71-10144

WATER POLLUTION.
Oregon Revised Statutes secs 449.075 thru 449.150 (1970).

Descriptors: *Oregon, *Water pollution, *Water pollution control, *Pollution abatement, Water quality control, Water pollution treatment, Abatement, Public health, Pollutants, Water pollution sources, Sewage, Sewage treatment, Industrial wastes, Wastes, Fish conservation, Wildlife conservation, Reasonable use, Legal aspects, Water law, Legislation, Administrative agencies, Damages, Remedies, Cities.

The express policy of these sections is to maintain and improve the quality of state waters by providing a far-reaching program for the prevention, abatement, and control of water pollution. Pollution, broadly defined in terms of cause and result, of any of the state's waters, also broadly defined, is prohibited and declared a public nuisance and a non-reasonable use of water. Polluters, in addition to being criminally liable, are liable to the state for damages to fish and wildlife. The disposal of treated wastes in state waters is prohibited without a permit from the Department of Environmental Quality, and discharge of untreated sewage or garbage is prohibited. The Environmental Quality Commission is empowered to establish and enforce water quality standards, and its other duties and powers with respect to water pollution are enumerated. Procedures, including emergency measures, for abating pollution through legal action are set out, and pollution abatement actions are given docket preference in state courts. Various types of specified conduct affecting the quality of the state's waters are regulated or prohibited. (Madsen-Florida)
W71-10145

PROTECTION OF WATER SUPPLY GENERALLY.
Oregon Revised Statutes, secs 449.205 thru 449.250 (1970).

Descriptors: *Oregon, *Water quality control, *Water supply, *Water pollution control, Public health, Municipal water, Administrative agencies, Water pollution, Pollution abatement, Water quality, Impaired water quality, Bacteria, Legal aspects, Water law, Legislation.

Protection of the public water supply, by placing it within the jurisdiction of the State Board of Health, is the goal of these sections. The Board is authorized to oversee and examine all inland waters, consult with municipal and private water supply agencies, and make rules and regulations controlling the quality of any water to be used for human consumption. The Board is directed to make periodic analyses of public water supplies and order immediate correction of quality deficiencies. If such corrections are not made, the Board may issue public warnings and request the district attorney to seek injunctive relief. All plans for construction or expansion of water supply or sewage facilities must be approved by the Board. (Madsen-Florida)
W71-10146

PROTECTION OF MUNICIPAL WATER SUPPLY.
Oregon Revised Statutes secs 449.305 thru 449.340 (1970).

Descriptors: *Oregon, *Municipal water, *Water quality control, *Water pollution control, Water pollution, Water pollution sources, Pollution abatement, Public health, Cities, Water supply, Watersheds (Basins), Legal aspects, Legislation.

Municipalities are granted jurisdiction over all lands acquired for municipal water works or the protection of public water supplies. Municipal governments are authorized to pass and enforce criminal ordinaces to protect the purity of water supplies and restrict or prohibit access to watershed areas. Pollution and activities which may pollute municipal water supplies are prohibited and declared to be nuisances which may be abated as other nuisances under state law. (Madsen-Florida)
W71-10147

TAX RELIEF ON POLLUTION CONTROL FACILITIES.
Oregon Revised Statutes secs 449.605 thru 449.665 (1970).

Descriptors: *Oregon, *Water pollution, *Water pollution control, *Taxes, Water quality, Water quality control, Tax rate, Pollution abatement, Guality control, Water pollution treatment, Wastes, Waste disposal, Water conservation, Administrative agencies, Legal aspects, Water law, Legislation, Costs, Financing.

Operators of air and water pollution control facilities, as defined by this statute, are granted relief from ad valorem taxes or an income tax credit, at the election of the owner, in proportion to the portion of their actual cost properly allocable to the prevention, control, or reduction of air or water pollution. The statute sets out the procedure for certification of facilities for tax relief and the factors to be considered in determining the cost allocable to pollution control. The Environmental Quality Commission is granted jurisdiction to act on applications for certification and to allocate costs, subject to appeal. Certification of pollution control facilities is to be revoked, upon notice, and future tax relief forfeited if the Commission finds that the facility has failed to perform as certified. (Madsen-Florida)
W71-10148

POLLUTION CONTROL BONDS.
Oregon Revised Statutes, secs 449.670 thru 449.695 (1970).

Descriptors: *Oregon, *Financing, *Government finance, *Pollution abatement, Pollutants, Legislation, Legal aspects, Air pollution, Water pollution, Economics, Taxes, Assessments, Operating costs, Water pollution control, Grants, Participating funds, Budgeting.

The Environmental Quality Commission, with the approval of the State Treasurer, is authorized to issue and sell such bonds as shall be necessary for pollution control purposes. The form of the bonds, maturity dates, interest rates and procedures for refunding and retiring the bonds are specified. The Commission shall decide the means of advertising the bonds and the procedures for sale. The money realized from the sale shall be credited to the Pollution Control Fund. The Commission shall administer the Fund and is authorized to advance funds for eligible projects and acquire obligations of cities, counties or state agencies issued for purposes of undertaking or completing eligible projects. The Commission is required to maintain a Pollution Control Sinking Fund to pay the obligations issued under the Act. An ad valorem tax for pollution control purposes shall be levied to supplement available funds in meeting the requirements of the ensuing fiscal year. The Commission is authorized to receive and use federal aid and other donations. Gallagher-Florida)
W71-10149

BASS ANGLERS SPORTSMAN'S SOC'Y V US PLYWOOD-CHAMPION PAPERS, INC (PRIVATE PARTY HAS NO RIGHT TO ENFORCE ANTI-POLLUTION PROVISION OF RIVERS AND HARBORS ACT).
324 F Supp 302-307 (SD Tex 1971).

Descriptors: *Texas, *Rivers and Harbors Act, *Pollution abatement, *Water pollution control, Legal aspects, Judicial decisions, Water law, Water pollution, Impaired water quality, Public health, Water conservation, Water quality, Water quality control, Navigable waters, Navigable rivers, Remedies.

Plaintiff society sued various corporate and government defendants, seeking injunctive relief and damages for alleged industrial pollution of navigable waterways. Plaintiff relied upon the Rivers and Harbors Act of 1899, which proscribes such pollution under penalty of imprisonment and/or fine, one half of which may be paid to the party giving information leading to conviction. Plaintiff contended that this latter provision entitled it to maintain a qui tam action to enforce the Act. The United States district court dismissed plaintiff's complaint and held that the Act contained no express or implied authority for private qui tam actions. The court pointed out that the informer's rights under the Act were entirely dependent on government enforcement of a criminal statute. The court also held that the Secretary of the Army could not be required to develop and implement pollution standards for navigable waterways, since the Act merely granted him the power to do so when, in his discretion, such standards were required. (Madsen-Florida)
W71-10150

DRAINAGE DISTRICTS--POLLUTION CONTROL.
Public Act 76-2441, Illinois Legislative Service, p 568-569 (1970) amending Illinois Annotated Statutes ch 42, sec 473.

Descriptors: *Illinois, *Drainage districts, *Pollution abatement, *Waste treatment facilities, Legislation, Administrative agencies, Local governments, Water pollution control, Water pollution, Sewage, Financing, Administration.

An Illinois statute concerning drainage districts is amended to provide that whenever a drainage district collects and conveys sewage through long, continued, and common usage of drainage facilities likely to cause water pollution, or when such district is ordered by a court to abate water pollution, the district may: (1) improve or construct sewage works, including treatment facilities; (2) levy and collect assessments against property benefited; (3) borrow money; and (4) issue revenue bonds and exercise other powers provided by law for their issue. (Hart-Florida)
W71-10151

ADOPTION OF ORDINANCES BY SANITARY DISTRICTS,
Public Act 76-2437, Illinois Legislative Service, p 560-561 (1970) amending Illinois Annotated Statutes ch 42, secs 319.3, 319.4.

Descriptors: *Illinois, *Sewage districts, *Legislation, *Sewage, Financing, Loans, Interest, Pollution abatement, Sewage, Local governments, Legal aspects, Water pollution control, Administrative agencies.

An Illinois Statute concerning authorization of certain sanitary districts to construct sewage systems is amended to require that the board of trustees of each sanitary district creating or improving a sewerage system adopt an ordinance describing the contemplated project. If the district has been ordered to abate pollution from inadequately treated sewage, the fact shall be set forth in the ordinance. Furthermore, the ordinance shall set forth the project's estimated cost, useful life, and details of the revenue bonds to be issued. Covenants or restrictions and information concerning issuance of further revenue bonds may be promulgated in the ordinance. The ordinance shall pledge the derived revenue to maintenance of the system, provision of a depreciation fund, and payment of principal and interest on the revenue bonds. Following adoption of the ordinance, it must be published once in a general circulation newspaper or posted in 3 prominent places if there is no newspaper available. An order to abate sewage pollution, if any, shall be included in the publication. Ten days after publication, the ordinance will be effective, unless one-fifth or 300 of the district's registered voters request a referendum. The ordinance shall be effective, or ineffective, as applicable, immediately following the referendum. (Hart-Florida)
W71-10152

OHIO V WYANDOTTE CHEMICALS CORP (SUPREME COURT DECLINES ORIGINAL JURISDICTION OVER WATER POLLUTION COMPLAINT BY STATE),
91 Sup Ct 1005-1017 (1971). 13 p.

Descriptors: *Ohio, *Water pollution, *Heavy metals, *Federal jurisdiction, Chem-control, Chemical wastes, State jurisdiction, Pollution abatement, Administrative agencies, Lake Erie, Streams, Legal aspects, Judicial decisions, Adjudication procedure, Remedies.

Plaintiff state, seeking to invoke the original jurisdiction of the United States Supreme Court moved for leave to file a complaint against defendant chemical companies. Defendants were alleged to have discharged mercury into streams which ultimately reach Lake Erie, thereby contaminating plantiffs' environment. The action was for abatement of a public nuisance. The Supreme Court acknowledged its jurisdiction over the controversy, but held that it might decline to entertain a complaint brought by a state against citizens of another state only where: (1) refusing jurisdiction would not conflict with the policies underlying the Article III jurisdictional grant, and (2) the reasons for refusing jurisdiction are consistent with the Court's other responsibilities. Plaintiff's motion was denied. The Court noted that no serious federal question was raised, and that plaintiff could obtain jurisdiction over defendants in its own courts and decide the question on the same nuisance basis. Furthermore, the Court believed the problem more properly solved by cooperative study and conciliatory action by various administrative agencies. The absence of expertise in pollution matters was noted as a serious deterrent to adequate adjudication in the Supreme Court. (Hart-Florida)
W71-10153

PEYTON V HAMMER (NO PRESCRIPTIVE RIGHT TO POLLUTE STREAM),
269 NE2d 136-138 (Ct C P Clinton County, Ohio 1970).

Descriptors: *Ohio, *Pollution abatement, *Water pollution control, *Sewage disposal, Sewage, Streams, Remedies, Water quality control, Water pollution, Water pollution sources, Impaired water quality, Riparian rights, Wastes, Legal aspects, Judicial decisions, Legislation.

Plaintiff landowner sought to enjoin defendant homeowners from discharging sewage into a stream running through plaintiff's land. Defendants claimed a prescriptive right to discharge wastes into the stream, on the grounds that they had done so for 21 years. The Court of Common Pleas of Ohio granted the injunction sought by plaintiff, holding that Ohio's water pollution control statute prohibited defendants' actions. (Madsen-Florida)
W71-10154

BEAN V SEARS, ROEBUCK AND CO (POLLUTION OF WELL HELD PERMANENT DAMAGE TO REAL PROPERTY),
276 A2d 613-617 (Vt 1971).

Descriptors: *Vermont, *Water pollution, *Wells, *Damages, Remedies, Artesian wells, Water pollution sources, Pollutants, Oily water, Fuels, Water properties, Water quality, Water pollution effects, Water law, Legal aspects, Judicial decisions.

Plaintiff dairy farmer sued defendant retailer for pollution of plaintiff's artesian well. On appeal from a judgement for plaintiff, defendant conceded that the pollution was caused by oil leakage from a furnace installed improperly by defendant on plaintiff's farm. Defendant contended, however, that the evidence did not establish the pollution to be a permanent injury, and that the trial court therefore erred in instructing the jury to consider diminution in value when assessing damages. The Supreme Court of Vermont affirmed, holding expert testimony on the fair market value of the farm before and after pollution was properly received, although referring to the polluted well as the only source of water on the farm. The court pointed out that, despite evidence of the availability of non-polluted groundwater, the well was the only operative and productive source at the time under investigation. (Madsen-Florida)
W71-10155

OPEN PUBLIC HEARING TO DETERMINE WATER QUALITY STANDARDS,
Missouri Water Pollution Board, Jefferson City, Mo (1967). 1 p.

Descriptors: *Missouri, *Water policy, *Standards, *Water quality, Regulation, Water conservation, Water resources, Water resources development, State governments, Administrative agencies, Water pollution, Water utilization, Administration, Water quality control.

The Water Pollution Board shall hold an open public hearing before it establishes standards of water quality for any stream or body of water. Procedural guidelines are set forth dealing with notification of interested individuals and the public at large. The Board shall issue standards of water purity on the basis of oral or written information presented at the open public hearings, the technical means available for the reduction of pollution, and the economic factors involved. (Horwitz-Florida)
W71-10156

REGULATIONS FOR PREVENTION OF POLLUTION OF SUBSURFACE WATERS OF THE STATE,
Missouri Water Pollution Board, Jefferson City, Mo.
For primary bibliographic entry see Field 05G.
W71-10157

MARINE TOILET REGULATIONS,
Missouri Water Pollution Board, Jefferson City.
For primary bibliographic entry see Field 05G.
W71-10158

REGULATIONS FOR TURBID WATER DISCHARGES AND TO PREVENT INTERMITTENT OR ACCIDENTAL POLLUTION OF WATERS OF THE STATE,
Missouri Water Pollution Board, Jefferson City, Mo.
For primary bibliographic entry see Field 05G.
W71-10159

WATER QUALITY STANDARDS FOR INTERSTATE WATERS,
Kentucky Water Pollution Control Commission, Frankfort.
For primary bibliographic entry see Field 05G.
W71-10160

POLLUTION FROM BOATS AND VESSELS,
Kentucky Water Pollution Control Commission, Frankfort.
For primary bibliographic entry see Field 05G.
W71-10161

BY-PASSING OF SEWAGE, INDUSTRIAL, AND OTHER WASTE TREATMENT PLANTS; AND EMERGENCY, ACCIDENTAL, OR OTHER EXCESSIVE SPILLS AND DISCHARGES OF SEWAGE, INDUSTRIAL OR OTHER WASTES.
Kentucky Water Pollution Control Commission, Frankfort.
For primary bibliographic entry see Field 05G.
W71-10167

FREEDMAN V BOROUGH OF WEST HAZELTON (PUBLIC NUISANCE CAUSED BY DISCHARGE OF SEWAGE INTO DITCH).

297 Pa 58, 146 A 564-567 (1929)

Descriptors: *Pennsylvania, *Sewage disposal, *Water pollution sources, *Abatement, Judicial decisions, Legal aspects, Water law, Local governments, Sewers, Open channels, Outlets, Sewage, Sewage treatment, Environmental sanitation, Municipal wastes, Weirs, Structures, Water pollution, Odor, Water quality control, Damages, Remedies, Prescriptive rights

Defendant borough maintained a sewer system serving at least 300 dwellings. The flow of sewage from this system was discharged from the main conduit into a ditch flowing across plaintiff's land, which was being developed for residential purposes. The land had been overflowed by sewage on many different occasions, both in wet and in dry seasons. The overflow caused the emission of foul, offensive, and unhealthful odors, which created unhealthy conditions and great inconvenience to families living along the ditch. Defendant installed a device known as a leaping weir, which was designed to prevent the discharge of sewage, but failed to operate the device. The trial court enjoined further discharges and the Supreme Court of Pennsylvania affirmed. The trial court found that this condition constituted a public and continuing nuisance and caused irreparable damage and injury to the land of the plaintiffs. Defendant's claim of prescriptive right had no application, as the right to maintain a public nuisance cannot be acquired by prescription, nor can such right be a defense against an action for private injury caused by a public nuisance. (Johnson-Florida)
W71-10197

CITY OF HIGHLAND V AUER (CITY'S LIABILITY FOR PERMITTING RESIDENTS TO POLLUTE ITS SEWERS).
235 111 App 327-334 (1925)

Descriptors: *Illinois, *Pollutants, *Surface drainage, *Sewers, Cities, Water pollution, Water pollution sources, Water pollution effects, Water pollution control, Pollution abatement, Sewage, Surface runoff, Riddance (legal aspects), Repulsion (Legal aspects), Natural flow doctrine, Legal aspects, Judicial decisions.

Plaintiff landowner sought to enjoin defendant city from diverting polluted surface water over his property. Defendant had graded its streets and caused the surface water to flow over plaintiff's land; in addition, uphill residents discharged sewage, wash water, and other pollutants into the water which flowed across plaintiff's land, rendering plaintiff's land unsanitary. Defendant conceded it knew pollutants were being discharged into its streets, but contended it lawfully used ditches and drains to carry surface waters to natural outlets, and was not responsible for pollution created by third parties. The Illinois Appellate Court observed that defendant had ample authority to sever improper connections with its sewer, and held that defendant might be enjoined from maintaining a ditch into which third parties drained polluted water with defendant's knowledge and created a nuisance. The court said defendant's actions amounted to inverse condemnation. Furthermore, it was held that the lower court erred in ruling that defendant might increase the natural flow of water across plaintiff's land. (Hart-Florida)
W71-10198

CITY OF SPRINGFIELD V NORTH FORK OUTLET DRAINAGE DIST (PREVENTING DRAINAGE DISTRICT FROM STRAIGHTENING RIVER).
249 111 App 133-152 (1928).

Descriptors: *Illinois, *Water pollution, *Cities, *Sewage, Water pollution effects, Water pollution sources, Drainage districts, Water pollution control, Water supply, Administrative agencies, Riparian rights, Natural flow doctrine, Rivers, Nonnavigable waters, Legal aspects, Judicial decisions.

Plaintiff municipality sought to enjoin defendant drainage district from straightening a non-navigable river. Plaintiff obtained its water supply from the river. Forty miles upriver, another city discharged its municipal sewage into the river. The natural winding and slow flow of the river between the two cities purified the water sufficiently for plaintiff's use. Plaintiff contended that defendant's straightening would prevent this natural purification by shortening the distance the water flowed and decreasing the time span. The Illinois Appellate Court observed that plaintiff, as a riparian owner, was vested with a property right in the natural flow of the stream. Defendant's defense that the upriver city was the primary cause of the pollution was rejected, since defendant contributed to the nuisance. Defendant also contended that plaintiff's proper remedy was an injunction to prevent the upriver city from discharging its sewage into the river. The court also rejected this contention. Accordingly, the court affirmed the lower court's writ temporarily restraining defendant from continuing the ditch, pending decision upon whether the straightening would pollute plaintiff's water. (Hart-Florida)
W71-10203

COOK V CITY OF DU QUOIN (CITY'S LIABILITY FOR POLLUTION OF STREAM).
256 111 App 452-458 (1930).

Descriptors: *Illinois, *Water pollution, *Cities, *Sewage, Water pollution sources, Water pollution effects, Water quality, Water quality control, Farms, Pollutants, Pollution abatement, Legal aspects, Judicial decisions.

Plaintiff riparian landowner sought damages and an injunction to compel defendant city to abate discharge of municipal sewage into the creek passing through plaintiff's farm. The creek passed within 40 yards of plaintiff's dwelling, and the deleterious odor deprived him of the comfort and enjoyment of his home. Additionally, the water was unfit for watering plaintiff's livestock. The Illinois Appellate Court observed that every riparian owner had a right to natural flow of the water and that pollution constitutes inverse condemnation. Defendant alleged that others contributed to the pollution; the court rejected that defense, stating that defendant would be jointly and severally liable with others contributing to pollution. Additionally, the court held that defendant was not relieved of liability because the sewer system was properly built. Affirming the lower court's judgment for plaintiff, the court determined that the proper measure of damages was compensation for deprivation of use and enjoyment of the property, rather than the diminution in rental value. (Hart-Florida)
W71-10204

WHITE V EDGERLY PETROLEUM CO (POLLUTION OF RICE CROP BY SALINE WATER FROM OIL WELL).
4 La App 20-22 (1925).

Descriptors: *Louisiana, *Saline water, *Saline water intrusion, *Rice, Oil wells, Oil industry, Oil wastes, Water pollution sources, Damages, Farms, Agriculture, Water pollution effects.

Plaintiff farmowner sued defendant petroleum company for damages caused by salt water in a bayou adjacent to his farm. Plaintiff planted a rice crop and pumped water from the bayou for irrigation. The water in the bayou had been contaminated with salt water from defendant's oil well, and plaintiff's rice crop was destroyed. Defendant contended on appeal that the evidence was insufficient to show that it was responsible for plaintiff's loss. However, the Louisiana Court of Appeals affirmed, holding that the evidence amply supported the lower court's verdict for plaintiff. (Hart-Florida)
W71-10205

WATER QUALITY STANDARDS FOR INTERSTATE WATERS IN WYOMING.
Wyoming Dept. of Public Health.
For primary bibliographic entry see Field 05G.
W71-10214

OKLAHOMA WATER LAW, STREAM AND SURFACE, THE WATER CONSERVATION STORAGE COMMISSION AND THE 1965 AND 1967 AMENDMENTS,
Joseph F. Rarick.
Oklahoma Law Review, Vol 24, No 1, p 1-16 (1971). 16 p, 90 ref

Descriptors: *Oklahoma, *Water conservation, *Water resources development, *Reservoir operation, Legal aspects, Legislation, Conservation, Reservoirs, Water resources, Water policy, Water demand, Water control, Water distribution (Applied), Water management (Applied), State governments, Water storage, Water supply, Water utilization, Water requirements, Water shortage, Water users, Water permits, Water rights.

The statutory development of the Water Conservation Storage Commission in Oklahoma is the subject of this article. The purpose of the legislation is to empower the Commission to contract with municipalities, industry, agricultural and other water users to insure that reservoirs of optimum storage capacity are constructed. The Citizens Committee persuaded the legislature to make the membership of the Commission the same persons who served on the Water Resources Board. The Citizens Committee was also successful in having language added to protect potential users within the locality of the reservoir. An Oklahoma Supreme Court case dealing with this legislation is discussed in detail. The 1965 amendments to the legislation, dealing with loss of water rights due to nonuse and development requirements, are explained. Legislation was passed in 1967 requiring a public hearing by the Water Resources Board when an officer of the United States notified the Board of plans to use the water of the state. The Board may attach conditions or reject the proposed withdrawal completely. Finally, several miscellaneous 1967 amendments to the legislation are examined. (Robinson-Florida)
W71-10215

FEDERAL ASSISTANCE FOR TREATMENT FACILITIES.
California Water Code Ann secs 13600 thru 13608 (West 1971).

Descriptors: *California, *Water quality control, *Financing, *Waste water treatment, Federal government, State governments, Local governments, Administration, Administrative agencies, Administrative decisions, Legal aspects, Legislation, Water quality, Water pollution, Water pollution control, Government finance, Costs, Economics, Budgeting, Waste treatment, Waste disposal, Waste water disposal, Waste water (Pollution), Water purification.

The State Water Resources Control Board shall administer any program of financial assistance for water quality control legally delegated to it and may accept funds from the United States or private persons to accomplish that objective. A survey of the state's needs for waste collection, treatment, and disposal and a report thereon shall be made by the state board. No commitment shall be made by the state board until it has found that adequate money is available. Review and approval of applications for grants for waste treatment and disposal projects under the Federal Water Pollution Control Act shall be made by the state board. If an application states that a local agency is unable to pay its share of the costs the state board shall determine if a sewerage service charge is necessary. Appropriations for project costs shall be without regard to fiscal years. No application for a grant or loan after January 1, 1971, shall be accepted unless at least one person responsible for plant operations meets or will meet operator training qualifications adopted by statute. (Robinson-Florida)
W71-10216

WATER WELLS AND CATHODIC PROTECTION WELLS.
California Water Code Ann secs 13700 thru 13806 (West 1971).

Descriptors: *California, *Well regulations, *Water pollution control, *Cathodic protection, Administrative agencies, Legislation, Water law, Legal aspects, Administration, Administrative agencies, Administrative decisions, Regulation, Water wells, Groundwater, Water pollution, Water quality, Water quality control, Subsurface waters, Groundwater basins, Acquifers.

A notice of intention and a notice of completion must be filed with the Department of Conservation when any person digs, bores, drills, reperforates, abandons, or destroys a well, water well, or cathodic protection well. The contents of these two reports are specified. These reports are not available to the public but only to governmental agencies. The conversion of an oil or gas well into a water or cathodic protection well shall be governed by this statute. Violation of this article constitutes a misdemeanor. The department shall recommend water well and cathodic protection well standards to the State Department of Public Health and the appropriate regional water quality control board if it deems necessary. The regional board shall then hold a public hearing. If the regional board finds that standards are needed it shall so report. Each affected city or county shall then establish ordinances providing such standards. If such cities or counties fail to pass ordinances the regional board

may adopt standards. The state board may review any action, report, or determination made by a regional board and shall do so on the request of any affected city or county. (Robinson-Florida)
W71-10217

PENALTIES FOR OIL DEPOSITED IN STATE WATERS.
California Harbors and Navigation Code Ann secs 151, 152 (West Supp 1971).

Descriptors: *California, *Water quality control, *Pollution abatement, *Costs, Legislation, Legal aspects, Water quality, Water pollution control, Water pollution, Pollutants, Pollutant identification, Oil, Navigable waters, Non-navigable waters, State governments, Water law, Water rights.

Any person that intentionally or negligently causes or permits any oil to be deposited in the waters of this state, including but not limited to navigable waters, shall be liable civilly in an amount not more than six thousand dollars. In addition, such person shall be liable to any governmental agency charged with the responsibility for cleaning up or abating any such oil for all actual damages, in addition to the reasonable costs actually incurred in abating or cleaning up the oil deposit in such waters. The amount of the civil penalty assessed shall be based upon the amount of discharge and the likelihood of permanent injury and shall be recoverable in a civil action by, and paid to, such governmental section. The agency cleaning up the oil deposit shall notify, in writing, the appropriate regional water quality control board of the nature of the deposit and of the corrective action taken or contemplated. (Johnson-Florida)
W71-10218

DISPOSAL OF CERTAIN SUBSTANCES; OPERATION OF CERTAIN EQUIPMENT.
California Fish and Game Code Ann secs 5652 thru 5655, 5803 (West Supp 1971).

Descriptors: *California, *Waste disposal, *Dredging, *Oil wastes, Legislation, State governments, Legal aspects, Water pollution sources, Water pollution control, Water quality control, Pollutant identification, Recreation wastes, Waste dumps, Animal wastes (Wildlife), Regulation, Administrative agencies, Oil, Pollution abatement, Fish, Fish conservation, Environmental effects.

It is unlawful to dispose of cans, bottles, garbage, rubbish, the viscera or carcass of any dead mammal, or the carcass of any dead bird into the waters of the state or within 150 feet of the high water mark of the waters of the state. Exceptions to the coverage of this section are specified. In addition, a permit from the Department of Fish and Game is required before any person can use any vacuum or suction dredge equipment in any river, stream or lake of this state. The permit shall be issued to the applicant if the Department determines that such operations will not be deleterious to fish. It shall be a misdemeanor to operate such equipment without a permit or outside the scope of the operations allowed in a permit. The Department is authorized to clean up or abate the affects of any petroleum or petroleum product deposited in the waters of the state and to recover any costs incurred as a result of such cleanup or abatement activity. (Johnson-Florida)
W71-10219

POLLUTION OR NAVIGABLE WATERS AND POLLUTION BY VESSELS.
California Health and Safety Code Ann secs 4400 thru 4433 (West 1970).

Descriptors: *California, *Waste disposal, *Boating regulations, *Water quality control, Legislation, State governments, Legal aspects, Water law, Water pollution control, Ships, Navigable waters, Sewage disposal, Sewage treatment, Radioactive waste disposal, Waste storage, Water pollution sources, Waste treatment, Regulation, Inspection, Water resources development, Oceans, Permits.

It shall be a misdemeanor for a person to place, deposit, or dump any garbage in or upon the navigable waters of the state or in the ocean within twenty miles of the coast line, or to load a vessel with garbage with the intent to so dispose of it. A vessel intending to dispose of a load of garbage in the ocean must carry an inspector for the State Department of Public Health. A person in charge of a vessel intending to dispose of radioactive waste into the ocean must give the Department five days notice; if it is determined that the public health and welfare will not be endangered, the vessel may leave without an inspector. No person shall maintain a vessel on the navigable waters of the state unless any toilet on the vessel is designed so that no human excreta can be discharged into such waters. It is a misdemeanor for a person to dump human excreta into the navigable waters of the state from a vessel which has toilet facilities available. (Johnson-Florida)
W71-10220

POLLUTION OF WATER SUPPLIES AND PUBLIC PLACES.
California Health and Safety Code Ann secs 4450 thru 4485 (West 1970).

Descriptors: *California, *Wastes, *Water quality control, *Water resources development, Legislation, Legal aspects, State governments, Water law, Water pollution, Water pollution control, Water pollution sources, Farm wastes, Sewage, Domestic wastes, Ships, Waste disposal, Regulation, Permits, Water supply, Coordination, Abatement.

It is a misdemeanor to violate these provisions, which prohibit certain disposals of specific wastes into the waters and upon certain places of the state. Included in these are prohibitions against: (1) drainage from septic tanks and similar devices into the water supply of state inhabitants, (2) pollution of the water supply by livestock, (3) bathing or other personal pollution of any waters of the state, (4) washing clothes in the water used for drinking purposes by the inhabitants of the state, and (5) mooring or anchoring within two miles of the intake of water used for drinking and domestic uses by municipalities. Any violation of these provisions also constitutes a public nuisance and may be abated by an injunction. A political subdivision owning or operating a reservoir for drinking or domestic purposes may open it to public fishing if a permit is obtained from the State Department of Public Health. A county may request the controlling governmental agency to open the reservoir to fishing and to develop a coordinated plan for development of the fishing and other recreational uses of the reservoir and surrounding land. (Johnson-Florida)
W71-10221

SEWAGE AND OTHER WASTE; PROCEDURE FOR ABATEMENT.
California Health and Safety Code Ann secs 5410 thru 5463 (West 1970).

Descriptors: *California, *Water quality control, *Pollution abatement, *Waste disposal, Legislation, State governments, Legal aspects, Water law, Water pollution control, Navigable waters, Non-navigable waters, Sewage, Municipal wastes, Sewage disposal, Sewers, Septic tanks, Costs, Regulation, Treatment facilities, Waste treatment.

Several terms are defined, including waste, pollution, and contamination. It is a misdemeanor for a person to discharge sewage or other waste in any manner which will result in contamination, pollution, or a nuisance. Whenever the state department of health or any local health officer finds that a contamination exists, they shall order it abated. These agencies may also bring an action for an injunction if necessary. Upon finding that a pollution or nuisance exists, the state department shall refer the condition to the proper regional water quality control board and may inspect and report to the board on any technical factors involved. There shall not be less than one water closet for each twenty employees working at a construction job site. Any action taken to abate contamination caused by a community sewerage system shall be taken against the operating agency and the contributors to the system. A health officer of any city, county, or sanitary district may connect a dwelling house with the adjoining street sewer if the owner fails to do so, the costs to be borne by the owner. (Johnson-Florida)
W71-10222

WATER POLLUTION CONTROL.
Revised Code of Washington Ann secs 90.48.010 thru 90.48.295 (1962) as amended (Supp 1970).

Descriptors: *Washington, *Pollution abatement, *Water quality control, *Administrative agencies, Water pollution, Water pollution treatment, Treatment facilities, Sewage treatment, Sewage disposal, Waste disposal, Waste treatment, Wildlife conservation, Public health, Standards, Wastes, Permits, Grants, Contracts, Supervisory control (Power), Administration, Municipal wastes, Industrial wastes, State governments, Local governments, Legal aspects, Legislation.

In order to prevent and control water pollution, the Department of Ecology is given authority to promulgate regulations relating to water quality standards and waste discharge. The Department shall determine water purity standards, taking into consideration the public health, the use of the water and surrounding lands, and the conservation of wildlife. It shall be unlawful for any person, corporation, or organization to discharge matter causing water pollution, or to injure or destroy wildlife through such pollution. Plans and proposed methods of operation and maintenance of sewage and disposal systems are to be submitted to the Department for approval. Enforcement methods are provided, along with penalties and procedures for review and adjudication. Prior to any operation involving waste discharges into waters, a permit must be secured from the Department or, if authorized, from any governmental unit operating a sewage system and treatment facilities. Conditions regulating the issuance of such permits are provided. Other powers and duties of the Department include the authority to contract with public corporations and political units, to provide grants for the financing of water pollution control projects, and to establish comprehensive plans for sewage drainage basins. (Smiljanich-Florida)
W71-10223

WATER POLLUTION CONTROL FACILITIES - FINANCING.
Revised Code of Washington Ann secs 90.50.010 thru 90.50.900 (Supp 1970).

Descriptors: *Washington, *Water pollution control, *Treatment facilities, *Financing, Economics, Financial feasibility, Grants, Loans, Interest, Taxes, Participating funds, Federal government, State governments, Legislation, Administration, Water pollution treatment, Pollution abatement, Water pollution sources, Domestic wastes, Industrial wastes, Sewage.
Identifiers: *Federal Water Pollution Control Act.

A state pollution control commission is authorized to make and administer grants to public bodies to assist them in constructing and improving water pollution control facilities. These facilities employ various devices to treat sewage and industrial wastes of a liquid nature, including the necessary intercepting sewers, pumping, power, and other equipment. The state finance committee is authorized to issue $25 million of general obligation bonds to provide state funds to match those federal funds provided under the Federal Water Pollution Control Act. The public bodies receiving these grants include municipal or public corpora-

tions, counties, and departments or agencies of state government. The statute provides that proceeds of bonds are to be deposited in a separate account, and that bond redemption is to be funded by sales tax revenues. (Rees-Florida)
W71-10224

WATER POLLUTION CONTROL ACT.

Alaska Statutes secs 46.05.155 thru 46.05.230 (Supp 1970) amending secs 46.05.010 thru 46.05.240 (1966).

Descriptors: *Alaska, *Water pollution control, *Oil wastes, *Damages, Administrative agencies, Administrative decisions, Regulation, Water law, Legal aspects, Legislation, Water pollution, Pollution abatement, State governments, Grants, Financing, Loans, Water supply, Sewage treatment, Water treatment, Oily water, Ships.

The Department of Health and Welfare may make payments or loans for waste treatment or water system projects. No person may pollute the waters of the state. It is unlawful to pollute the waters of the state by placing therein: petroleum, acid, coal or oil tar, lampblack, aniline, asphalt, bitumen, or a residuary product of petroleum. Polution caused by an act of God or by circumstances beyond the control of the person shall not create liability. Regulations are provided for ballast water discharge. Persons in charge of vessels or facilities shall notify the Department as soon as they have knowledge of any violation of this Act. Violation of these provisions constitutes a misdemeanor, and penalties are provided. In addition to criminal penalties violators are subject to liability to the state for specified liquidated damages and are liable in civil actions for damages. If the violation occured as a result of willfull misconduct or negligence the violator shall be liable for the full amount of damages caused. A vessel used in violation of this statute may be detained as security for damages. (Robinson-Florida)
W71-10225

VILLAGE SAFE WATER ACT.
Alaska Statutes secs 46.07.010 thru 46.07.080 (Supp 1970).

Descriptors: *Alaska, *Public health, *Sanitary engineering, *Government finance, Cities, Loans, Legislation, Legal aspects, Administration, Administrative agencies, State governments, Grants, Capital, Capital supply, Financing, Construction, Environmental sanitation.

Provision is made for the installation of at least one facility containing clean water, shower bath facilities, hygienic sewage disposal, and facilities for the washing of clothes in each village. The location of the facility shall be determined by the commissioner of health and welfare after consulting with the village governing body and with the appropriate public agencies. Construction may be accomplished by grants or loans to public agencies or private non-profit corporations. No contribution shall be required from the users. The village governing body shall accept complete ownership of the facilities and have the responsibility of maintaining and operating them. If the village is financially unable to operate the facility the commissioner may make grants which will enable the village to operate it. When necessary the commissioner may require the creation of a non-profit corporation in the village to carry out the purposes of the statute. The commissioner shall conduct an educational and informational program designed to familiarize the residents of each village with the health advantages of using the facility. (Robinson-Florida)
W71-10226

WATER POLLUTION.
Texas Penal Code Ann art 698c (Supp 1970).

Descriptors: *Texas, *Water pollution, *Pollution abatement, *Waste disposal, Ultimate disposal, Waste dilution, Water quality control, Water pollution sources, Public health, State governments, Administrative agencies, Permits, Personnel, Waste dumps, Pollutants, Disasters, Adjudication procedure, Legislation, Legal aspects.

No person may discharge any polluting wastes unless the waste is discharged in compliance with permits issued by certain authorized agencies. Unauthorized discharges or violations of permits shall be punishable as a misdemeanor and subject to fines. Parts and wildlife department employees are made peace officers for enforcement of the statute. Waste discharges caused by a natural catastrophe are not included. Various procedural provisions are set forth, including venue requirements, service of summons, pre-trial procedures, and enforcement of fines. (Smiljanich-Florida)
W71-10227

SOLID WASTE DISPOSAL ACT.
Texas Civil Status Ann art 4477-7 (Supp 1970).

Descriptors: *Texas, *Solid wastes, *Ultimate disposal, *Waste disposal, Water pollution, Pollution abatement, Waste dumps, Waste storage, Waste treatment, Water pollution control, Water pollution sources, Water quality control, Municipal wastes, Industrial wastes, Administrative agencies, State governments, Local governments, Cities, Legislation, Supervisory control (Power), Public health, Air pollution, Legal aspects.

The Texas State Department of Health is hereby empowered to control all aspects of municipal solid waste collection, handling, storage, and disposal. The Department shall consult with the Texas Water Quality Board with respect to water pollution control. The Board is hereby empowered to control all aspects of industrial solid waste collection, handling, storage, and disposal. The Board shall consult with the Department with respect to public health aspects. Where both municipal and industrial solid wastes are involved, the Department shall have primary supervisory responsibility. The two agencies are given power to: (1) promulgate necessary rules and regulations; (2) create subordinate agencies; (3) inspect and approve disposal sites; (4) require and issue permits authorizing and governing solid waste disposal sites, according to prescribed procedures and limitations; (5) provide educational, advisory, and technical services to other state agencies; and (6) accept federal and state funds relating to solid waste management. Counties are given limited powers to administer solid waste programs, pursuant to procedures set forth. Penalties for violations of this act are provided, along with necessary remedial powers and judicial procedures. (Smiljanich-Florida)
W71-10228

INJECTION WELL ACT.
Texas Civil Statutes Ann Title 128, art 7621b (Supp 1970).

Descriptors: *Texas, *Injection wells, *Waste disposal, *Permits, Municipal wastes, Industrial wastes, Water pollution, Legal aspects, Legislation, Public benefits, Oil industry, Geologic formations, Oil wastes, Water pollution sources, Subsurface waters.

Before industrial or municipal wastes are disposed of through injection wells, a permit must be obtained from the Water Quality Board. To apply for a permit, the applicant must obtain a letter from the Texas Railroad Commission stating that the injection well will not endanger any oil or gas formation. The Board and other specified agencies evaluate the probable effect of the well and make recommendations. The Board may hold a public hearing if deemed necessary. For injection well disposal of wastes arising out of or incidental to the drilling for or producing of oil or gas, the applicant must obtain a permit from the Railroad Commission. The applicant must submit to the Commission a letter from the Board stating that the well will not endanger the fresh water strata in the area of its location. If the proposed injection well is in the public interest, will not impair existing rights, and surface and groundwaters can be adequately protected by appropriate well regulations, the application may be granted. Failure to comply with this act may subject the violator to a civil fine not to exceed $1000 per day for each act of non-compliance. (Gallagher-Florida)
W71-10229

TEXAS WATER QUALITY ACT.
Texas Civil Statutes Ann Title 128, art 7621d-1 (Supp 1970).

Descriptors: *Texas, *Water Quality Act, *Waste disposal, *Water quality control, Water pollution, Permits, Legislation, Legal aspects, Water quality, Standards, Public health, Local governments, Administrative agencies, Inspection, Waste water treatment, Water pollution control.
Identifiers: *Texas Water Quality Act.

The purpose of the Act is to maintain a standard water quality consistent with: (1) public health and enjoyment, (2) protection of wildlife, (3) operation of existing industries, and (4) economic development. The Texas Water Quality Board is the principal authority to administer the Act. Administrative provisions concerning the Board are specified. The Board shall establish the level of water quality to be maintained and develop a comprehensive plan for controlling water quality. Among other things, the Board is empowered to: (1) conduct research; (2) enter property to inspect conditions relating to water quality; (3) examine records; (4) encourage cooperation; (5) initiate legal actions; (6) make contracts, rules, orders and necessary regulations; (7) provide for public hearings; (8) set water quality standards; (9) issue permits for discharge of wastes; (10) approve waste disposal systems; and (11) accept and make grants. Discharge of any wastes is prohibited unless authorized by appropriate action or regulation of the Board. The Act further specifies: (1) the authority of local governments, (2) penalties for non-compliance, and (3) procedures for obtaining judicial review of Board action. (Gallagher-Florida)
W71-10230

GULF COAST WASTE DISPOSAL AUTHORITY (STATE POLLUTION CONTROL BY REGIONAL AGENCY).

Texas Civil Statutes Ann art 7621d-2 (Supp 1970).

Descriptors: *Texas, *Legislation, *Water quality control, *Waste disposal, Septic tanks, Solid wastes, Non-structural alternatives, Water supply, Pollution abatement, Public health, Water pollution treatment, Quality control, Long-term planning, On-site investigations, Regulations.

The Gulf Coast Waste Disposal Authority was established in an effort to solve water quality problems on a regional level. Its function is to control water pollution and waste disposal within Chambers, Galveston, and Harris counties. This function is allocated to a planning phase and a rule-making and enforcement phase. The Authority is responsible for preparation of successive ten year master plans for pollution and waste control. The nature and location of waste disposal systems constitutes the single mandatory component of these plans. Among other duties, the authority shall: (1) prescribe, subject to approval by the state quality board, standards for water in the district; (2) establish minimum standards of operation for all aspects of solid waste handling which are consistent with established state criteria; (3) regulate the use of septic tanks where desired; and (4) regulate waste disposal from watercraft. The Authority may enforce its own regulations as well as those of the state quality board. Violators are subject to civil

penalties. The statute also outlines the Authority's administrative structure and provides for local funding through bond issues. (Kohla-Florida)
W71-10231

POWERS AND DUTIES OF GAME AND FISH DEPARTMENT--POLLUTION OF WATERS.

Descriptors: *Arizona, *Administrative agencies, *Fish conservation, *Water pollution control, Water law, Legislation, State governments, Administrative decisions, Fish, Fishing, Fish management, Legal aspects, Water pollution, Water policy, Water resources, Water quality, Water quality control, Waste disposal, Waste water disposal.

This statute describes the membership, appointment and removal of members and the method of meeting of the state game and fish department. Restrictions, duties, and discretionary powers of the commission are also detailed. The commission is authorized to bring suit in the name of the state to restrain or enjoin any person, corporation, or government agency from discharging or dumping into a stream or body of water in the state any deleterious substance injurious to wildlife. (Robinson-Florida)
W71-10232

STATE BOARD OF HEALTH.
Arizona Revised Statutes Ann secs 36-102, 36-105 (Supp 1970).

Descriptors: *Arizona, *Public health, *Environmental sanitation, *Water pollution control, Legislation, Legal aspects, Diseases, Water pollution, Water quality control, Organic wastes, Industrial wastes, Sanitary engineering, Sewage disposal, Waste water treatment, Waste disposal, Domestic wastes, Regulation, Administrative agencies.

The composition and qualifications for membership of the board of health are specified in this statute, as well as the powers and duties of the board. The board of health shall prescribe by regulation necessary: (1) measures for detecting and controlling communicable diseases; (2) disease prevention measures in disposal of human bodies; (3) procedures for access to vital records; (4) measures to assure the purity of human food and drink; (5) regulations regarding domestic and industrial water supply production, treatment, and distribution to assure proper quality; (6) regulations to assure the proper quality of ice and bottled water; (7) industrial waste disposal and sewage treatment regulations to prevent contamination or pollution of underground and surface waters and the transmission of disease; (8) measures regarding disposal of garbage and human excrement; (9) specific regulations for water quality, sewage disposal and garbage disposal at public accommodations, schools, place of employment, swimming pools, public buildings, subdivisions, fertilizer plants, and slaughter houses; and (10) health regulations for child care centers. Procedures for implementing the regulations of the board are also specified. (Gallagher-Florida)
W71-10233

PROHIBITION AGAINST DUMPING WASTE MATERIAL IN WATERWAYS.
Arizona Revised Statutes Ann secs 5-301, 5-302, 5-311 (Supp 1970).

Descriptors: *Arizona, *Legislation, *Waste disposal, *Water pollution control, Non-structural alternatives, Water quality control, Adoption of practices, Water pollution, Water pollution sources.

No person shall dump, deposit, place, throw or leave refuse, rubbish, debris, or filthy or odoriferous objects, substances, or other trash on any waterways or the shorelines of any waterways of the state. This prohibition extends to waters common to interstate boundaries. The thoroughness of the prohibition is indicated by the applicable definitions of person and waterway. The statute defines person as any individual, firm, corporation, partnership or association, and any agent, assignee, trustee, executor, receiver or representative thereof; and, it defines waterway as any body of water upon which any boat, raft, or other contrivance used or designed for navigation on water is able to be navigated. (Kohla-Florida)
W71-10234

WATER POLLUTION--OIL DISCHARGES.
Revised Code of Washington Ann secs 90.48.315 thru 90.48.365 (Supp 1970).

Descriptors: *Washington, *Pollution abatement, *Oil, *Water pollution, Water pollution control, Water pollution sources, Ships, Industrial wastes, Pollutants, Oily water, Oil wastes, Water pollution treatment, Oil industry, Waste disposal, Water quality control, Permits, Standards, Reimbursable costs, Cost repayment, United States, State governments, Administrative agencies, Legislation, Legal aspects.

It shall be unlawful for oil to enter the waters of the state from any ship or installation, regardless of the cause of the entry or fault of the person having control over the oil. Exceptions shall be made for persons expressly authorized to discharge oil by the Department of Ecology and for discharges caused by war, sabotage, or negligence of the United States government or the state of Washington. Any person causing an oil discharge shall be responsible for containing, collecting, or dispersing the oil. The Department may take such actions as are necessary to contain, collect, or disperse the oil, and the persons responsible shall be liable to the state for any necessary expenses incurred. The Department shall investigate the circumstances of the oil discharge, and shall order the persons responsible to reimburse the necessary expenses incurred by the Department. If necessary, legal action to recover the expenses is authorized. Permits to discharge oil may be granted by the Department if consistent with water quality standards and established treatment requirements. Penalties are provided for violations of the Act, along with necessary enforcement powers of the Department. (Smiljanich-Florida)
W71-10235

FUNCTIONS OF HEALTH DEPARTMENTS (WATER POLLUTION AND QUALITY CONTROL).
Oklahoma Statutes Ann Title 63, sec 1-206 (Supp 1970).

Descriptors: *Oklahoma, *Water pollution control, *Water quality control, *Environmental sanitation, Legal aspects, Public health, Administration, Administrative agencies, State governments, Local governments.

County, city, district, and city-county health departments shall, within their respective jurisdictions, maintain programs for: (1) environmental health, (2) water pollution control, and (3) protection of the quality of public water supplies. The section is expressly intended not to conflict with existing jurisdiction of the Corporation Commission in water pollution matters. (Madsen-Florida)
W71-10236

WATER RIGHTS.
Oklahoma Statutes Ann title 60, sec 60 (1971).

Descriptors: *Oklahoma, *Water allocation (Policy), *Natural flow, *Obstruction to flow, Legislation, Water pollution, Surface runoff, Ground water movement, Ownership of beds, Streambeds, Streamflow, Dams, Water quality, Domestic water, Subsurface waters, Legal aspects, Underground streams, Subsurface drainage, Prior appropriation.

This Oklahoma statute grants to landowners ownership of waters standing on the land or flowing over or under its surface but not forming a definite stream. Ground water use; however, is governed by the Oklahoma Ground Water Law. Waters within definite underground or surface streams are public waters subject to appropriation for public benefit. A landowner may use water from streams flowing over his land for domestic purposes as long as he does not prevent the stream's natural flow or pollute it. The landowner may also dam streams flowing on his land to collect or store water. This right; however, is limited in two respects: (1) the landowner may not store or collect an amount in excess of that which he owns by virtue of the statute, and (2) the landowner must provide for the continued natural flow of the stream less the uses authorized by the statute. Furthermore, the statute does not limit the power of the Oklahoma Water Resources Board to permit storage of additional water. (Gallagher-Florida)
W71-10237

OKLAHOMA WATER POLLUTION CONTROL ACT OF 1955.
Oklahoma Statutes Ann Title 82, secs 901 thru 914 (1970).

Descriptors: *Oklahoma, *Permits, *Pollution abatement, *Water pollution control, Legislation, Industrial wastes, Water quality control, Legal aspects, Waste disposal, Municipal wastes, Waste water treatment, Classification, Standards, Water pollution sources, Waste identification.

Oklahoma declares it a matter of public policy to conserve, protect, maintain, and improve the quality of state waters. To achieve this objective, the Water Resources Board is empowered to: (1) develop anti-pollution programs; (2) cooperate with and receive funds from other state, federal, or private agencies; (3) conduct studies and disseminate information; (4) promulgate water quality standards and classify waters; (5) prohibit discharge of wastes into waters; and (6) require construction of new disposal systems. It is a misdemeanor to cause pollution unless discharge is in accord with the prescribed classification system. Pollution not in accordance with the classification system is declared a public nuisance. It is unlawful without a permit to: (1) discharge industrial wastes into waterbodies, (2) increase the volume or strength of wastes under an existing permit, (3) construct industrial or commercial establishments that would increase the discharge of wastes, or (4) construct any new waste outlet. The health department is responsible for municipal sewage. Procedures are set forth for: (1) establishing and implementing water classifications, (2) giving notice and hearings to violators, (3) dealing with emergency conditions, (4) inspecting facilities, and (5) obtaining injunctions. (Gallagher-Florida)
W71-10238

WASTE TREATMENT FACILITIES.
Oklahoma Statutes Ann Title 82, secs 921 thru 925 (1970).

Descriptors: *Oklahoma, *Taxes, *Treatment facilities, *Industrial wastes, Waste water treatment, Water pollution, Legal aspects, Legislation, Administrative agencies, Investment, Financial analysis, Investigations, Economic feasibility, Technical feasibility, Economic impact, Financing.

The Oklahoma legislature declared a public policy favoring: (1) encouragement of investment in waste treatment facilities by industries whose operations result in water pollution, and (2) maintenance of Oklahoma as an attractive location for industrial development. Industries causing unacceptable water pollution are entitled to credits against income tax liability amounting to 20% of the net investment cost of effective waste treatment facilities annually until the entire investment is recovered. To qualify for the credit, a company must submit an application and supporting infor-

mation concerning: (1) the nature and extent of pollution caused by the company, (2) the effectiveness of the proposed treatment facilities, and (3) alternative methods. Designated agencies evaluate the application to: (1) verify the accuracy of the supporting information; (2) determine which type of treatment facility is best, ecologically and financially; and (3) determine the approximate capital investment required. After these determinations, the state agencies shall certify all relevant information to the taxing agency. All other state agencies are to cooperate in the administration of this Act. (Gallagher-Florida)
W71-10239

POLLUTION CONTROL COORDINATING ACT OF 1968.
Oklahoma Statutes Ann Title 82, secs 931 thru 939 (1970).

Descriptors: *Oklahoma, *Water quality act, *Water quality control, *Water pollution control, Water quality, Legal aspects, Legislation, Water law, Water pollution abatement, Water pollution, Waste disposal.

The intent of this act is to coordinate and eliminate duplication of effort in the state agencies having statutory authority in water quality control, and to create an agency with broad overall powers to control and abate water pollution. A State Department of Pollution Control is established, to be administered by a board consisting of the heads of the five state agencies already vested with pollution control jurisdiction. This board has broad authority, including: (1) coordination; (2) investigation; (3) research; (4) establishment and enforcement of water quality standards; and (5) the power, upon notice and hearing, to issue orders for the prevention, control, or abatement of water pollution. Criminal penalties are provided for violation of the act or duly promulgated regulations, and it is declared that injunctive relief shall be available without a showing of a lack of adequate remedy at law. (Madsen-Florida)
W71-10240

DELETERIOUS SUBSTANCES IN STREAMS (CRIMINAL PENALTIES AND ABATEMENT).
Oklahoma Statutes Ann Title 29, sec 409 (Supp 1970).

Descriptors: *Oklahoma, *Water pollution control, *Pollution abatement, *Water pollution, Pollutants, Water law, Legal aspects, Streams, Ponds, Lakes, Water quality control, Water pollution sources, Saline water, Legislation, Administration, Administrative agencies.

Pollution of any stream, lake, or pond by depositing a deleterious substance therein is proscribed by this section and made punishable by fine. The Corporation Commission is given power to abate pollution by ordering and enforcing corrective action. The section is made expressly inapplicable to pollution resulting from scientific tests or improvements by the Game and Fish Commission. (Madsen-Florida)
W71-10241

ACT AUTHORIZING MUNICIPAL CORPORATIONS TO PURCHASE OR CONDEMN LAND FOR WATERWORKS AND THE PROTECTION THEREOF FROM POLLUTION.
Oklahoma Statutes Ann Title 11, secs 293, 293.1 293.2 (1959) as amended (Supp 1970).

Descriptors: *Oklahoma, *Municipal water, *Water pollution control, *Reservoir sites, Cities, Eminent domain, Reservoirs, Reservoir construction, Legal aspects, Water law, Damages, Remedies, Water pollution, Pollution abatement, Water quality control, Water works.

Municipal corporations are empowered to purchase or take by eminent domain any land deemed necessary to establish municipal water works. Additionally, a municipality may purchase or condemn any land surrounding its reservoir if the land is deemed necessary to protect the reservoir from pollution. Pollution of any waterbody or watercourse used as a municipal water supply is declared unlawful, and municipalities are granted a right of action for damages for any such pollution. (Madsen-Florida)
W71-10242

OKLAHOMA FEED YARDS ACT.
Oklahoma Statutes Ann Title 2, secs 9-208, 9-210 (Supp 1970).

Descriptors: *Oklahoma, *Water pollution, *Water pollution control, *Surface drainage, Surface waters, Surface runoff, Water pollution sources, Livestock, Pollutants, Water quality control, Domestic animals, Agriculture, Legal aspects, Legislation.

Each licensed feed yard operator is required by this statute to provide adequate drainage for surface waters; avoid pollution of any stream, lake, river, or creek; and provide reasonable methods for the disposal of animal excrement. (Madsen-Florida)
W71-10243

OKLAHOMA RESOURCES DEVELOPMENT ACT OF 1965.
Oklahoma Statutes Ann Title 74, secs 1101 thru 1105 (Supp 1970), sec 351 c (1965).

Descriptors: *Oklahoma, *Resource development, *Administrative agencies, *Pollution abatement, Human resources, Natural resources, Economics, Feasibility studies, Project planning, Management, Administration, Long-term planning, Future planning (Projected), Programs, Coordination, Decision making, Optimum development plans, Legislation, Water pollution, Water pollution control.

This Act relates to state industrial, commercial, agricultural, economic and recreational development. The Industrial Development and Park Commission is authorized to promote the development and use of the natural and human resources of the state so as to provide for a balanced, dynamic, and expanding economy. The Commission supercedes certain specified regulatory agencies; its duties are varied: (1) to develop and maintain long-range plans; (2) to promote and administer planning, development, recreation, and promotional state activities; (3) to be an advisory agency to the governor, the legislature, state agencies, municipalities, and private organizations; and (4) to assemble and provide information and research results. The membership, compensation, and organization of the Commission are delineated. The Commission is authorized to regulate and control the pollution of all watercourses and subsurface water in Oklahoma or flowing through the state. Any person, corporation, or firm which violates any pollution control law, rule, or regulation is guilty of a misdemeanor. This section shall not affect or limit the existing statutory powers of the Corporation Commission or the Proration Commission in regulating and controlling streams and water pollution. (Rees-Florida)
W71-10244

CONTROL OF CONTAMINATION AND POLLUTION IN SPECIAL AREAS AND WATERS.
Oregon Revised Statutes, secs 449.505 thru 449.580 (1970).

Descriptors: *Oregon, *Water pollution control, *Water quality control, *Municipal water, Pollution abatement, Water pollution, Water pollution sources, Sewage, Sewage treatment, Lakes, Rivers, Streams, Legal aspects, Water law, Legislation.

Pollution of specified watercourses and waterbodies and their drainage basins, as defined by these sections, is prohibited with the primary intent of protecting municipal water supplies. The precise conduct proscribed and the penalties to be imposed vary with the water area involved. Criminal penalties are set out, with additional civil liability and nuisance abatement procedures prescribed for specific cases. (Madsen-Florida)
W71-10245

STATE MARINE BOARD.
Oregon Revised Statutes, secs 488.825, 488.830 (1969).

Descriptors: *Oregon, *Boating regulations, *Recreation facilities, *Water pollution, Legislation, Legal aspects, Marinas, Public health, Boating, Water sports, Recreation, Classification, Navigation, Buoys, Administrative agencies, Safety, Water pollution sources, Waste disposal.

A state Marine Board consisting of members appointed by the Governor is established. The Board is specifically empowered to: (1) devise a system of identifying numbers for boats; (2) cooperate with state and federal agencies to promote uniform boating regulations; (3) make necessary contracts; (4) provide for the development of boating facilities throughout the state; (5) publicize the advantages of safe boating; (6) advise and assist law officers in proper enforcement of boating regulations; (7) accept gifts and grants; (8) exempt from any provisions of the chapter any class of boats, provided no material loss of safety results; (9) appoint agents to issue identifying numbers for boats; (10) publish and distribute boating laws and necessary application forms; (11) make rules for uniform navigational markings consistent with Coast Guard regulations; (12) make rules regarding the use of marine toilets consistent with the control and prevention of water pollution and the maintenance of public health; and (13) institute proceedings to enjoin unlawful obstructions to navigation. Waste disposal regulations may require sealing or otherwise rendering inoperative toilets not equipped with an approved device to render waste harmless, but may not conflict with rules or regulations of the State Board of Health or the Environmental Quality Commission. (Gallagher-Florida)
W71-10246

DISCHARGING REFUSE INTO DRAINAGE FACILITIES PROHIBITED.
Oregon Revised Statutes secs 547.425, 547.430 (1969).

Descriptors: *Oregon, *Water pollution, *Obstruction to flow, *Damages, Drainage, Legislation, Legal aspects, Wastes, Waste disposal, Remedies, Water pollution control, Pollution abatement, Abatement.

Discharging refuse, polluting, or obstructing any drainage waterway is prohibited. Any person violating this prohibition may be held liable to the owner of the drainage waterway in a civil action to compensate him for the expense of removing filth or obstructions and for all damage that may be done or occasioned to the ditch or waterway. (Hart-Florida)
W71-10247

WATER SUPPLY AND SEWAGE.
Kansas Statutes Ann secs 65-161 thru 65-171 (h) (1964), as amended (Supp 1970).

Descriptors: *Kansas, *Water quality control, *Sewage treatment, *Water supply, Water pollution, Pollution abatement, Permits, Standards, Water purification, Public health, Water quality, Domestic water, Treatment facilities, Water delivery, Water distribution (Applied), Water treatment, Regulation, Administrative agencies, Administration.

Anyone supplying water to the public must file with the board of health a copy of the waterworks plans and a description of the supply source. A permit

must be obtained for the use of any additional source. it is a misdemeanor to supply water to the public from waterworks constructed or extended subsequent to this Act without a permit from the board. The board is authorized to: (1) investigate water supply systems and require changes necessary to protect the public health, and (2) order cessation of water delivery to any location where existing conditions might contaminate the public water supply. A permit is required to discharge sewage into state waters unless the disposal system was in existence before the Act, but this exception does not permit discharges prejudicial to the public health. The Act also provides regulations for: (1) prevention of water pollution, (2) disposal of sewage wastes, (3) protection of air and water from sewage contamination, (4) minimum standards for sanitary water and sewage systems, (5) penalties for violations, (6) procedures for appeal from board decisions, (7) investigation and abatement of pollution, and (8) technical advisors to the board. (Gallagher-Florida)
W71-10248

POWERS AND DUTIES OF BOARD OF HEALTH--SANITARY STANDARDS FOR PROTECTION OF WATER RESOURCES.
Utah Code Ann sec 26-15-5 (Supp 1969).

Descriptors: *Utah, *Standards, *Water pollution control, *Administrative agencies, Legislation, State governments, Legal aspects, Water law, Regulation, Water supply, Water management (Applied), Watershed management, Water pollution, Groundwater, Sanitary engineering, Water distribution (Applied), Effluents, Water pollution sources, Wastes, Sewage treatment, Sewage, Sewage disposal.

The board of health shall have the power and duty to establish minimum sanitary standards for: (1) the collection, treatment, and distribution of drinking water, including sanitary supervision, regulation, and control of the construction, extension, operation, and maintenance of public water supply collection, treatment, and distribution systems and approval of plans covering the construction and extension of such systems; (2) the quality of public water supplies and the effluents of sewerage systems, sewage treatment plants, and trade wastes discharged upon the land or into surface or ground waters; (3) the protection of watersheds used for public water supplies; and (4) the prevention of pollution of any waters. (Johnson-Florida)
W71-10249

INTRUSION AND POLLUTION OF WATER--RELATIONSHIPS WITH GAS AND OIL.
South Dakota Compiled Laws 1967 Ann secs 45-9-1 thru 45-9-15 (1969).

Descriptors: *South Dakota, *Oil wastes, *Oil wells, *Water pollution sources, Legislation, State governments, Administrative agencies, Legal aspects, Regulation, Oil, Natural gas, Water pollution, Oil reservoirs, Oil-water interfaces, Fresh water, Saline water, Water pollution control, Pollutants.

The production of gas in conjunction with the production of water insofar as such gas comes from the water-bearing formations is expressly excluded from the coverage of this chapter. The state oil and gas board may regulate or delegate the regulation of the disposal of salt water and oil field wastes. The board may require the drilling, casing, operation, and plugging of wells in such a manner as to prevent: (1) the detrimental intrusion of water that is avoidable by efficient operations into an oil or gas pool; or (2) the pollution of freshwater supplies by oil, gas, or salt water. The board may require the furnishing of a performance bond in the amount of five thousand dollars per well drilled, up to twenty thousand dollars, conditioned on the proper performance of the above mentioned requirements. (Johnson-Florida)
W71-10250

WATER POLLUTION CONTROL (CONSTRUCTION GRANTS FOR POLLUTION CONTROL FACILITIES).
Kansas Statutes Ann secs 65-3301 thru 65-3307 (Supp 1970).

Descriptors: *Kansas, *Treatment facilities, *Construction costs, *Water pollution control, Public health, Waste treatment, Legislation, Legal aspects, Municipal wastes, Sewage, Waste disposal, Waste water treatment, Sewage treatment, Federal government, Government finance, Participating funds, Grants, Financing.

Due to the numerous adverse effects of water pollution, the legislature declared that it was essential to undertake a program to financially assist construction of public water pollution control facilities. The program is essential for the public health, welfare and safety as well as financially advantageous, due to federal government incentives. A Water Pollution Control Account is created to provide financial assistance to any county, city, sewer district, or other public agency in the construction of pollution control facilities eligible for federal aid under the Water Pollution Control Act or the Clean Water Restoration Act. The state's share in construction costs shall not exceed 25% of the eligible costs of each project. For effective administration of this Act, the State Board of Health is empowered to make all necessary rules and regulations and to approve grants from the account. The Board may not make committments in excess of the funds available in the account. (Gallagher-Florida)
W71-10251

WATER POLLUTION ABATEMENT,
Idaho Code secs 39-3601 thru 39-3612 (Supp 1970).

Descriptors: *Idaho, *Pollution abatement, *Water pollution control, *Sewage treatment, Water pollution, Water pollution sources, Pollutants, Water pollution treatment, Abatement, Sewage, Sewage disposal, Municipal wastes, Cities, Administrative agencies, Legal aspects, Water law, Legislation, Regulation, Administration.

The express intent of this chapter is to prevent and control water pollution, support technical research in water pollution control, and provide financial assistance to municipalities in the abatement and prevention of water pollution. Several measures are adopted to further these ends: (1) The State Board of Health is given jurisdiction to administer this chapter. (2) Grants to municipalities to aid construction of sewage treatment works, administered by the Board of Health, are authorized. The criteria to be considered in allocating such grants and the conditions imposed upon recipient municipalities are set out. (3) The sale of water pollution control bonds is authorized. (4) A separate fund, the water pollution control fund, is established in the state treasury for the purposes of financing grants to municipalities and repaying water pollution control bonds. (5) Cottage sites leased to private parties by the state are required to have sewage disposal facilities constructed at the leasee's expense. (Madsen-Florida)
W71-10252

ADMINISTRATION OF POLLUTED WATERS,
Hawaii Revised Statutes secs 321-16, 321-16.1 (Supp 1970).

Descriptors: *Hawaii, *Environmental sanitation, *Water quality control, *Treatment facilities, Water supply, Drainage water, Drainage systems, Sewage disposal, Sewage treatment, Water pollution control, Pollution abatement, Water pollution sources, Waste, Administrative agencies, Regulation, Investigations, Water quality, Standards, Permits, Public health, Financing, Grants, Construction, Federal government, State governments, Water resources development.

The director of health is authorized to regulate, supervise, and control all state waters, drainage water systems, water supplies and water plants, sewage disposal systems, and the disposal of any substance likely to create a nuisance of injure public health. To effectuate a comprehensive program of pollution control and abatement, masters appointed by the director, after conducting investigations and hearings, shall establish water quality standards for the present and best future uses of polluted waters. The director's powers are extensive: (1) he must approve in writing any drainage, sewage, or water supply system that might alter the diluting effect of ocean currents; (2) he may conduct experiments as to the purity and potability of water to monitor pollution; (3) he may require reports describing the operation and proposed alterations of existing systems; and (4) he may grant state funds to state or county agencies to construct necessary waste treatment facilities. Such funded projects must conform with the state water pollution control plan and have priority over other eligible projects, and must be assured to operate and be maintained efficiently. A grant recipient must pay 25% of the estimated project cost. (Rees-Florida)
W71-10253

STATUS OF WATER QUALITY AND SIGNIFICANT SOURCES OF WASTE WATER DISCHARGES IN MARYLAND.
Maryland Dept. of Water Resources, Annapolis; and Maryland Dept. of Health and Mental Hygiene, Annapolis.
For primary bibliographic entry see Field 05G.
W71-10254

WATER POLLUTION CONTROL IN COLORADO,
For primary bibliographic entry see Field 05G.
W71-10255

INSTALLATION AND OPERATION OF SEPTIC TANK SEWAGE DISPOSAL SYSTEMS,
Delaware Water and Air Resources Commission, Dover.
For primary bibliographic entry see Field 05D.
W71-10256

WATER QUALITY STANDARDS.
Delaware Water and Air Resources Commission, Dover.
For primary bibliographic entry see Field 05G.
W71-10257

WATER POLLUTION CONTROL IN COLORADO.
Colorado Dept. of Health, Denver.
For primary bibliographic entry see Field 05G.
W71-10258

RULES AND GUIDELINES FOR WATER POLLUTION CONTROL AT LIVESTOCK CONFINEMENT AREAS AND GUIDELINES FOR CONSTRUCTION OF SEALED EVAPORATION AND RETENTION PONDS.
Colorado Dept. of Health, Denver. Water Pollution Control Commission.
For primary bibliographic entry see Field 05G.
W71-10259

GENERAL RULES AND REGULATIONS RELATING TO WELLS.
Utah Dept. of Natural Resources, Salt Lake City. Div. of Oil and Gas Conservation.

Rules C-1 thru E-6 p 28-48, 1969, 21 p.

Descriptors: *Utah, *Oil wells, *Water pollution control, *Well regulations, Well casings, Logging (Recording), Well permits, Drilling, Well spacing, Injection wells, Groundwater, Oil wastes, Oil fields, Oil industry, Natural gas, Regulation, Pollution

abatement, Streams, Reservoirs, Drainage, Water pollution sources, Water pollution control, Legislation, Legal aspects, Conservation.

Any persons proposing well operations shall obtain surety bonds insuring the proper plugging of wells in accordance with rules and regulations set forth herein. Owners of wells shall take all reasonable precautions to avoid polluting streams, reservoirs, natural drainage ways, and underground water, including the proper disposal of liquid wastes from well productions. In order to conserve the oil and gas supply, the Oil and Gas Conservation Commission may establish drilling units for a pool, regulating the spacing of well therein. Before the initial drilling of any well, written notice of the character of the work proposed must be given to the Commission. Other requirements concerning gas and oil well operations include: (1) the filing of well logs at specified times; (2) drilling procedures in specialized areas, such as wildcat territory and potash areas; (3) reports of casing and water shut-off tests; (4) procedures for underground disposal of water; (5) notice to the Commission of various well procedures; and (6) procedures regarding the abandonment and plugging of wells. Injections wells shall be properly cased and cemented to avoid damage to fresh water resources. (Smiljanich-Florida)
W71-10260

POLLUTION AND ATTENDANT PROBLEMS,
For primary bibliographic entry see Field 05G.
W71-10261

LOCAL AND REGIONAL WATER POLLUTION CONTROL IN TEXAS,
For primary bibliographic entry see Field 05G.
W71-10262

WATER POLLUTION CONTROL (ALLOCATION OF REGULATORY POWER IN TEXAS),
Tim Carssow.
Texas Law Review, Vol 48, No 6, p 1034-1046, 1970, 13 p, 83 ref.

Descriptors: *Texas, *Administrative agencies, *Water pollution control, *Supervisory control (Power), Water policy, Water pollution, Pollution abatement, Pollution identification, Standards, Water pollution treatment, Water Quality Act, Regulation, Water quality control, Rivers and Harbors Act, Waste treatment, Waste water (Pollution), Non-structural alternatives, State governments, Federal government, Administration, Environmental sanitation, Legal aspects, Legislation.

Water pollution control in Texas is examined in this article through an analysis of the various state agencies dealing with the problem and the scope of federal action in the area. The Texas Water Quality Board and the Railroad Commission are primarily responsible for water pollution control in Texas. Other state agencies with secondary pollution control responsibilities include the following: the Department of Health, the Parks and Wildlife Department, the Water Development Board, and the Water Well Drillers Board. The respective responsibilities of thses agencies are set forth and analyzed. The author suggests the centralization of water pollution control functions in the Water Quality Board, thereby avoiding both the dilution of authority and a duplication of efforts. Federal water pollution control efforts are analyzed primarily in terms of enforcement procedures under the Federal Water Pollution Control Act and the Refuse Act. The author concludes that federal enforcement power is adequate to intervene if Texas fails to adequately protect its waters. (Horwitz-Florida)
W71-10263

PESTICIDE POLLUTION,
For primary bibliographic entry see Field 05G.
W71-10264

THE TEXAS WATER QUALITY BOARD,
For primary bibliographic entry see Field 05G.
W71-10265

THE SANTA BARBARA OIL SPILL,
For primary bibliographic entry see Field 05G.
W71-10266

WATER QUALITY CRITERIA FOR INTRASTATE WATERS.
Mississippi Air and Water Pollution Control Commision, Jackson.

Regulation WPC-3-70, 1970, 12 p.

Descriptors: *Mississippi, *Water quality control, *Water Quality Act, *Water pollution sources, Administrative agencies, Administration, Surface waters, Natural streams, Water pollution control, Water properties, Water supply, Water resources, Water sources, Water treatment, Water purification, Wastes, Waste disposal, Water users, Water utilization, Public health, Water sports, Recreation, Shellfish, Wildlife, Navigation.

The Mississippi Air and Water Pollution Control Commission is authorized to develop water quality criteria for intrastate waters. The objective is to prevent, eliminate, and reduce pollution to acceptable levels in order to protect the public health and to enhance the quality of these waters for their various uses. Minimum conditions applicable to all waters are established to free intrastate waters from materials and substances attributable to industrial, municipal, agricultural, and other discharges. Seven use classifications are established, each with its own specific water quality criteria: (1) public water supply; (2) shellfish harvesting areas; (3) recreation, (4) fish and wildlife; (5) agricultural and industrial water supplies; (6) navigation and utility use; and (7) drainage. A listing of all intrastate waters by river basins, with their classifications, is also included. (Rees-Florida)
W71-10267

ANNUAL REPORT 1970.
Delaware River Basin Commission, Trenton, N.J.
For primary bibliographic entry see Field 05G.
W71-10268

ANNUAL REPORT 1968.
Delaware River Basin Commission, Trenton, N.J.
For primary bibliographic entry see Field 05G.
W71-10269

MISSOURI WATER PLAN, STATE LAWS, POLICIES AND PROGRAMS PERTAINING TO WATER AND RELATED LAND RESOURCES.
Missouri Water Resources Board, Jefferson City.

Publication WRB 2, 1969, 78 p, 1 fig, 432 ref.

Descriptors: *Missouri, *Non-structural alternatives, *Coordination, *Water management (Applied), Administrative agencies, Adoption of practices, Decision making, Institutional constraints, Legislation, Planning, Water allocation (Policy), Water resources development, State governments, Water pollution control, History.

The Missouri Water Plan is designed to serve as a legislative reference for existing water conditions and to offer a framework for developing institutional approaches to water planning. The Plan presents a profile description of all existing instrumentalities which can affect the use and quality of the state's water resources. It outlines the history, composition, function, and some accomplishments of the Water Pollution Board. It also notes the problems in Board operations caused by a lack of clear legislative guidelines for granting permits and establishing water quality standards. The Plan describes the authority of cities, towns, and villages to acquire, distribute and protect their own water sources from pollution and contamination. These municipal powers are subject to regulation by the Division of Health; however, where the water distribution function is performed by a water company, regulations are prescribed by the Public Service Commission. The Plan notes that a similar disparity in power and requirements exists with respect to the creation of overlapping special water supply and sewage districts. The Plan also provides a current water resources organization and communication diagram. (Kohla-Florida)
W71-10270

WATER QUALITY CRITERIA.
Alabama Water Improvement Commission, Montgomery.
For primary bibliographic entry see Field 05G.
W71-10271

SOME ASPECTS OF THE ALABAMA WATER IMPROVEMENT COMMISSION'S PROGRAM FOR CONTROL OF WATER POLLUTION.
Alabama Water Improvement Commission, Montgomery.
For primary bibliographic entry see Field 05G.
W71-10272

PERMITS TO DISCHARGE SEWAGE, INDUSTRIAL WASTES OR OTHER WASTES.
Kentucky Water Pollution Control Commission, Frankfort.

Regulation WP-1, (1957). 3 p.

Descriptors: *Kentucky, *Permits, *Waste disposal, *Waste treatment, Administrative agencies, Administrative decisions, Waste water treatment, Water quality, Water quality control, Water pollution, Water pollution control, Waste water (Pollution), Regulation, State governments.

Permits are required to discharge sewage, industrial wastes, and other wastes into the waters of Kentucky. For new works, written application must be made to the Water Pollution Control Commission, with final detailed plans and specifications for the disposal system. The permit application shall describe the process producing the water to be treated, the character and quantity of the wastes, and the proposed treatment operation. If there is an existing discharge system, sewage volume and strength data shall also be furnished. Existing discharge works must file an application to continue operation; the Commission may require submission of data to determine the suitability of the works. Reports of the prior operation of the works may also be required by the Commission on a periodic basis. Furthermore, samples or analyses of the treated water must be furnished as directed by the Commission. If the Commission determines the works will not violate Kentucky statutes, the permit shall be issued, stipulating conditions and allowable time of the discharge. Tolerance permits may be issued where no immediate harm will result and proper discharge works are in process. Permits will terminate at a specified time, and may be terminated earlier following notice and public hearing showing a violation of permit conditions. (Hart-Florida)
W71-10273

ENVIRONMENT REPORT--BILLS TO AUTHORIZE CLASS ACTIONS RECOGNIZE RIGHT TO CLEAN ENVIRONMENT,
James R. Wagner.
National Journal, Vol 3, No 24, p 1245-1250, 1971, 6 p.

Descriptors: *United States, *Water pollution control, *Political aspects, *Legislation, Public health, Public rights, Legal aspects, Water law, Water quality control, Water pollution, Administrative agencies, Water pollution sources, Jurisdiction, Regulation, Adjudication procedure, Relative rights, Reasonable use, Pollution abatement, Water rights.
Identifiers: *Class-action lawsuits.

Conservation-minded members of Congress are trying to enact legislation granting individuals the right to sue public agencies and private parties for general damage to the environment. This would be allowed in bills authorizing environmental class-action lawsuits. The idea behind this legislation is that any citizen should be able to sue to halt environmental degradation since the environmental quality is a public trust that must be protected for the common good. Under one bill, federal agencies would no longer be immune from suit, and the courts would have authority to overturn agency decisions that were substantively wrong. This same bill would recognize a substantive right to a clean environment, and a plaintiff would not have a show special injury to himself in order to sue a private person allegedly despoiling the environment. Opposition to the bills has come from governmental agencies, lawyers, and polluters. The reasoning by this opposition is that the courts would be clogged with frivolous cases and that judges are not equipped with the necessary expertise to make the proper decisions. The future of these bills now rests with the political process. (Johnson-Florida)
W71-10274

FORTY YEARS OF WATER POLLUTION CONTROL IN WISCONSIN: A CASE STUDY,
For primary bibliographic entry see Field 05G.
W71-10275

TREATMENT REQUIREMENTS.
Pennsylvania Sanitary Water Board, Harrisburg.

Article 300, Rules and Regulations, (March 1968). 2 p.

Descriptors: *Pennsylvania, *Water pollution control, *Waste water treatment, *Water quality control, Water pollution treatment, State governments, Administrative agencies, Administrative decisions, Regulation, Standards, Water pollution, Water quality, Pollution abatement, Legal aspects, Waste treatment, Waste water disposal, Water policy, Waste water (Pollution), Biological properties.

All biodegradable wastes shall be given a minimum of secondary treatment as herein defined. Industrial wastes shall receive secondary treatment or its equivalent. The equivalent of secondary treatment is required for non-degradable wastes. Primary treatment or its equivalent shall be provided for biodegradable wastes discharged into a stream polluted by abandoned coal mines where stream alkalinity is exhausted and the pH of the stream is 4.0 or less. Secondary treatment shall be required on streams where water quality is expected to improve due to scheduled pollution abatement programs or where primary treatment would pollute downstream waters. A definition of primary treatment is herein provided. Effective disinfection to control disease-producing organisms shall be the production of an effluent meeting fecal coliform concentration standards herein set forth. (Robinson-Florida)
W71-10276

MINE DRAINAGE.
Pennsylvania Sanitary Water Board, Harrisburg.

Art 700, Rules and Regulations, N.D. 4 p.

Descriptors: *Pennsylvania, *Mine drainage, *Permits, *Regulation, Water pollution, Water pollution control, Water pollution sources, Pollution abatement, Mine wastes, Strip mine wastes, Acid mine water, Mine acids, Legislation, Legal aspects, Coal mines, Acid streams.

The discharge of acid mine drainage into clean waters is prohibited, and permits are required to discharge other mine drainage. Specific regulations govern discharge into: (1) polluted or unclean streams, (2) clean streams, and (3) polluted or unclean streams which flow into clean streams. To protect the state waters, specific methods for disposal of acid-forming refuse from strip mines are prescribed. Procedures are established for: (1) revocation of a permit for noncompliance with requirements, (2) dealing with mines abandoned before a permit application has been acted upon, and (3) preventing mining operations carried on without a permit. Surface water that might drain into stripping pits must be effectively diverted to prevent acid mine drainage. Permits for strip mines may be issued on an experimental basis to test the effectiveness of precautions against water pollution. Mine operators are required to post permits in a place and to notify the board when mining operations are commenced. (Gallagher-Florida)
W71-10277

SPECIAL REGULATIONS.
Pennsylvania Sanitary Water Board, Harrisburg.

Art 800, Rules and Regulations, 1967. 2 p.

Descriptors: *Pennsylvania, *Water pollution control, *Pollution abatement, *Regulation, Legislation, Legal aspects, Algicides, Aquatic weed control, Herbicides, Fish control agents, Water pollution, Recreation facilities, River basin development, Nutrients, Wastes, Water pollution sources, Administrative agencies.

Whenever any substance which would endanger downstream users of water or damage property is discharged, accidentally or otherwise, into the waters of the Commonwealth, the party responsible is required to notify the regional office of the health department. The retention of polluting wastes on private land is permitted, but it is the responsibility of those in control of such wastes to maintain retaining structures so as to prevent any possible water pollution. Special regulations for the use of algicides, herbicides and fish control chemicals are set forth, as well as regulations concerning: (1) camps on state forest lands, (2) protection of Wallenpaupack Lake from pollution, and (3) nutrient control for the Lower Susquehanna River Basin. (Gallagher-Florida)
W71-10278

REGULATIONS FOR PUBLIC WATER SUPPLIES.
Pennsylvania Dept of Health, Harrisburg.

Art 443, Rules and Regulations, 1964. 4 p.

Descriptors: *Pennsylvania, *Water supply, *Water purification, *Regulation, Water works, Water delivery, Water distribution (Applied), Public health, Water storage, Water treatment, Treatment facilities, Water analysis, Water quality control, Fluoridation, Disinfection, Environmental sanitation.

The purpose of these regulations is to protect the public health through the proper design, operation, and maintenance of water supplies. Before supplying water to the public, the owner of a water supply must obtain a permit which is revocable for noncompliance with these regulations. Requirements and standards are established for: (1) the disinfection of water supply facilities, (2) water quality, (3) water quantity and pressure within the system, (4) the maintenance and operation of supply facilities, (5) the disinfection of water supplied to the public, (6) protection of water sources, (7) protection against unsafe connections, and (8) levels of fluoridation. The procedure for revocation, suspension, and modification of permits is specified. (Gallagher-Florida)
W71-10279

ENVIRONMENTAL CONTROL ACT.
Illinois Ann Statutes ch 111 1/2, secs 1001 thru 1051 (Smith-Hurd Supp 1971).

Descriptors: *Illinois, *Environmental sanitation, *Water pollution control, *Pollution abatement, Water quality control, Water works, Water supply, Administrative agencies, Regulations, Domestic wastes, Radioactive wastes, Sewage, Air pollution, Water pollution, Standards, Permits, Legislation, Legal aspects, Regulation.

The Environmental Control Act is designed to establish a unified, state-wide program to restore, protect and enhance the quality of the environment. Specific agencies are created to administer the Act. The Act authorizes the establishment of air and water quality standards and prohibits the use of any vehicle or facility capable of causing air or water pollution without a permit from the Pollution Control Board. Additional sections of the Act are designed to: (1) protect public water supplies and insure the quality of water from public water works, (2) prevent land pollution from refuse disposal, (3) control excessive and unreasonable noise pollution, (4) control pollution from atomic radiation, and (5) provide procedures for emergency conditions. To accomplish the objectives of the Act, the Board may adopt necessary procedural regulations. The Environmental Protection Agency is empowered to enforce the Act by appropriate orders after investigation and hearing. The Act also provides: (1) for granting variances where the regulations create arbitrary or unreasonable hardship, (2) procedures for granting permits, (3) for judicial review, and (4) penalties for non-compliance. (Gallagher-Florida)
W71-10280

CHICAGO SANITARY DISTRICT--POLLUTION CONTROL.
Public Act 76-2438, Illinois Legislative Service, p 562-565 (1970). 4 p.

Descriptors: *Illinois, *Water pollution control, *Treatment facilities, *Regulations, Construction, Permits, Legislation, Legal aspects, Water pollution, Pollution abatement, Sewage treatment, Sewage disposal, Waste disposal, Sewage, Sanitary engineering, Environmental sanitation, Construction.

This amendment to a prior act creating sanitary districts gives to the Chicago Sanitary District certain powers and duties to further pollution control. The amendment requires the sanitary district to: (1) investigate and determine ways to remove or abate pollution, (2) require permits for the construction or extension of sewerage systems, (3) require submission of plans and specifications before a permit is issued, (4) establish rules and procedures for submission and review of plans, (5) provide notice and a hearing when an order to discontinue discharge is given, and (6) revoke or modify permits when necessary. Violation of any order creates a nuisance, and the sanitary district superintendent may seek mandamus or an injunction. Provision is also made for fines, administrative review, and exemptions from the provisions. (Gallagher-Florida)
W71-10281

RIVER CONSERVANCY DISTRICTS--POLLUTION CONTROL.
Public Act 76-2439, Illinois Legislative Service, p 566-567 (1970). 2 p.

Descriptors: *Illinois, *Water pollution control, *Water conservation, *Administrative decisions, Treatment facilities, Water resources development, Environmental sanitation, Water supply, Pollution abatement, Water polluiton, Legal aspects, Legislation, Administration, Permits, Administrative agencies, Regulation.

A prior act authorized the creation of river conservancy districts and gave the districts power to effectuate river and flood control, drainage, irrigation, conservation,sanitation, navigation, recreation, the development of water supplies and sewerage systems, and the protection of fish life. This amendment to the prior act imposes on the board of trustees the duty to prevent the pollution of any waters from which a water supply may be obtained by any municipality within the district. To comply with this obligation, the board is authorized

to appoint a police force for the purpose of preventing pollution within the district. The board must act diligently and without delay to prevent pollution of district waters. Before any work is commenced under provisions of this act the plans must be submitted to and approved by the Department of Public Works and Buildings and the State Environmental Protection Agency. (Gallagher-Florida)
W71-10282

CERTIFICATION OF POLLUTION CONTROL FACILITIES FOR TAX RELIEF.
Environmental Protection Agency, Washington, D.C.

Federal Register, Vol 36, No 102, p 9509-9511 (May 1971). 3p.

Descriptors: *United States, *Water policy, *Treatment facilities, *Amortization, Regulation, Administrative agencies, Legal aspects, Federal government, State governments, Taxes, Water pollution sources, Facilities, Water pollution control, Waste disposal, Waste treatment, Heat, Pollution abatement, Financing, Government finance.

The Administrator of the Environmental Protection Agency may certify eligible water pollution control facilities for accelerated amortization under the Tax Reform Act of 1969. A facility will not be certified prior to the time it is placed in operation. Application for certification must include specified information about the facility and the discharges that it controls. The facility will not be certified until it is determined that: (1) it has been certified by the state, (2) it removes wastes or heat which otherwise would be released into the environment, (3) the applicant is in compliance with all federal regulations applicable to the facility, and (4) the facility furthers the general policies of the United States and the states in the prevention and abatement of pollution. The general policy of the United States is stated to be cooperation with the states in the prevention and abatement of water pollution. Criteria are listed for determining whether the use of a facility furthers this general policy. Certification of a facility may be revoked at any time that its operation ceases to implement the general policy. (Johnson-Florida)
W71-10283

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT.
National Marine Fisheries Service, Washington, D.C.

Federal Register, Vol 36, No 106, p 10736-10737 (June 1971). 2 p.

Descriptors: *United States, *Water pollution control, *Projects, *Fisheries, Regulations, Administrative agencies, Water law, Legal aspects, Standards, Water quality control, Water pollution, Environment, Contracts, Water resources development, Federal government, State governments.
Identifiers: *National Environmental Policy Act.

Regulations are promulgated concerning the procedures to be followed by the Secretary of Commerce in providing financial assistance to state agencies for research and development of the commercial fisheries of the nation. Any project contracted for between the state and federal governments under these regulations shall be performed in a manner consistent with the policies set forth in the National Environmental Policy Act of 1969. In the performance of work under a cooperative agreement, the state shall take such action as is necessary to avoid pollution of water as a direct or indirect result of contract activities. Water quality must be maintained at a level consistent with applicable water quality standards. (Johnson-Florida)
W71-10284

IMPLEMENTATION OF NATIONAL ENVIRONMENTAL POLICY.

Federal Register, Vol 36, no 107, p 10807-10810 (June 1971). 4 p.

Descriptors: *Administrative agencies, *Environmental effects, *Highway effects, *Quality control, Federal government, Legislation, Regulation, Legal aspects, Transportation, Railroads, Air environment, Ecology, Publications, State governments, Feasibility, Local governments, Administrative decisions, Administration, Water pollution.

The Interstate Commerce Commission instituted a proceeding to determine the best means of implementing the policies of the National Environmental Policy Act in order to meet its statutory obligations. Since the Commission's regulatory duties are broad, its objective is to adopt practical procedures that will be adaptable to a wide variety of cases. Special rules are proposed to insure that environmental values are given appropriate consideration. Under these rules, a detailed environmental statement will be made whenever a regulatory action will have significant environmental impact. Administrative feasibility dictates, however, that this requirement be limited to those proceedings which are determined to have a significant effect on environmental quality. Notice of such proceedings will be transmitted to the Council of Environmental Quality and to appropriate federal, state, and local governmental bodies, with a request for comment on the environmental considerations. Factors for the determination of all issues are enumerated. (Shelnut-Florida)
W71-10285

LICENSING OF PRODUCTION AND UTILIZATION FACILITIES (NUCLEAR POWER REACTORS).
Atomic Energy Commission, Washington, D.C.

Federal Register, Vol 36, No 111, p 11113-11117 (June 1971). 5 p.

Descriptors: *Nuclear powerplants, *Design criteria, *Radioactive wastes, *Treatment facilities, Administrative decisions, Nuclear reactors, Nuclear wastes, Federal government, Administration, Administrative agencies, Regulation, Standards, Legal aspects, Electric powerplants, Nuclear energy, Nuclear engineering, Effluents, Permits, Waste treatment, Adoption of practices, Electric power industry.

Pursuant to the Atomic Energy Act of 1954, notice is hereby given of proposed amendments to 10 CFR Part 50, Licensing of Production and Utilization Facilities. Proposed numerical guides, intended to keep the radioactive level in effluents as low as practicable, are herein set forth for the operation of light-water-cooled nuclear reactors. Applications for reactor-construction permits shall include a description of the equipment to be utilized in controlling radioactive effluent materials. Applications filed after January 2, 1971, must specify design objectives and the methods to be employed in keeping effluent-radiation levels as low as practicable. If effluent-release-radiation rates exceed twice the design standards, the licensee shall investigate, initiate a reduction program, and report such actions to the Commission. If release rates are four to eight times design standards the Commission shall take action to reduce the rate. The proposed guides for design objectives and limiting conditions on reactor operation herein set forth are consistent with basic radiation standards recommended by international and national organizations. It is expected that conformance with such guides will result in exposure levels indistinguishable from exposures due to variations in natural background radiation. (Robinson-Florida)
W71-10286

ENVIRONMENTAL STATEMENTS--PROPOSED GUIDELINES ON PREPARATION AND COORDINATION.
Corps of Engineers, Washington, D.C.

Federal Register, Vol 36, no 113, p 11309-11318 (June 1971). 10 p.

Descriptors: *Water resources development, *Coordination, *Project planning, *Environmental effects, Federal government, Administrative agencies, State governments, Local governments, Quality control, Federal project policy, Regulation, Legal aspects, Legislation, Permits, Construction.

The Corps of Engineers has prepared guidelines to be used in the preparation and processing of environmental statements, as required by the National Environmental Policy Act. The regulation applies to all elements of the Corps which exercise responsibility for planning, development, and management of water resource programs. The statement will serve as an evaluation of the effects that alternative actions would have on the environmental and will constitute an integral part of the pre-authorization process. The activities of the Corps which will require statements are enumerated. In the development of new projects, consultation and coordination with federal, state, and local agencies and the interested public will be continued throughout the entire planning process. The regulation prescribes guidelines, as well as sample formats, for the specific content of the statements. Procedures for preparation and processing are also prescribed for survey reports, special projects, operation and maintenance, continuing construction, permit applications, and disposal of land for port and industrial uses. (Shelnut-Florida)
W71-10287

CONSTITUTIONAL POLICY FAVORING CONSERVATION.
New York Constitution art XIV, secs 4, 5 (McKinney Supp 1970).

Descriptors: *New York, *Preservation, *Water resources development, *Conservation, Water pollution, State governments, Pollution abatement, Air pollution, Scenery, Legislation, Legal aspects, Land tenure, Shore protection, Wetlands, Regulation.
Identifiers: *Constitutional provisions.

The state's policy shall be to conserve and protect its natural resources and scenic beauty and to encourage the development and improvement of its agricultural lands. The legislature, in implementing this policy, shall include adequate provision for the abatement of air and water pollution, and of excessive noise; the protection of agricultural lands, wetlands and shorelines; and the development and regulation of water resources. The legislature shall further provide for the acquisition of lands and waters outside the forest preserve counties and the dedication of such properties for the use and enjoyment of the people. Properties so dedicated shall constitute the state nature and historical preserve, and they shall not be taken or disposed of except by law. A violation of any of these provisions may be restrained at the suit of the people or, with consent of the Supreme Court in appellate division, on notice to the attorney general at the suit of any citizen. (Shelnut-Florida)
W71-10288

ENVIRONMENTAL QUALITY CONTROL.

Hawaii Revised Statutes secs 341-1 thru 341-6 (Supp 1970).

Descriptors: *Hawaii, *Environmental sanitation, *Pollution abatement, *Ecology, Environmental engineering, Economics, Economic justifications, Universities, Professional Societies, Education, Training, Research, Administrative agencies, Legislation, Monitoring, Investigations, Long-term planning, Future planning (Projected), Research

facilities, Water pollution, Air pollution, Soil conservation, Social values, Public health.

The Act's purpose is to stimulate, expand, and coordinate efforts to determine and maintain the optimum quality of the state environment. Three administrative agencies are established: (1) an office of environmental quality control to advise the governor; (2) an ecology or environmental center within the state university to expand, coordinate, and promote education, research, and service efforts respecting environmental quality, particularly as to human needs and social institutions; and (3) an environmental council serving as liaison between the director and the general public by soliciting information, complaints, and recommendations, primarily through public hearings. The director of environmental quality control has extensive duties and powers: (1) to direct attention to ecological and environmental problems; (2) to develop a system for monitoring environmental and social conditions, changes, and effects on health, air, water, wastes, noise, soil, and pesticides; (3) to conduct research or arrange for the conduct of research through contracts with state agencies and private groups; (4) to recommend programs for long-range implementation; (5) to recommend necessary legislation; (6) to initiate public educational programs; and (7) to offer advice and assistance to private industry and governmental agencies. (Rees-Florida)
W71-10289

WATER QUALITY ACT.
New Mexico Statutes Ann secs 75-39-1 thru 75-39-12 as amended (Supp 1970).

Descriptors: *New Mexico, *Water Quality Act, *Administrative agencies, *Pollution abatement, Water pollution, Water quality control, Water quality, Regulation, Water policy, Water law, Control, Quality control, Water pollution control, Standards, State governments, remedies, Damages, Legislation, Legal aspects, Administration.

The water quality control commission is created to supervise and coordinate state activity in controlling water pollution. The Act establishes the procedures which the commission must follow when adopting regulations and provides means for judicial review of such regulations. The powers and duties of the commission concerning water pollution abatement are enumerated in order to give the commission complete authority over all other state agencies. The commission is given the authority to seek injunctions to stop activity which it considers in violation of any regulation, and the district courts are empowered to impose civil penalties not exceeding one thousand dollars for each violation of the Water Quality Act or any regulation of the commission. (Horwitz-Florida)
W71-10290

WATER POLLUTION (STATUTORY AUTHORITY FOR ADMINISTERING POLLUTION CONTROL PROGRAM).
Revised Codes of Montana secs 69-4801 thru 69-4819 (1970).

Descriptors: *Montana, *Water pollution control, *Water quality control, *Administrative agencies, Water quality, Water pollution, Beneficial use, Wastes, Municipal wastes, Industrial wastes, Waste disposal, Pollution abatement, Water pollution sources, Sewage, Sewage disposal, Sewage treatment, Sewerage, Legal aspects, Water law, Legislation, State governments, Adoption of practices, Supervisory control (Power).

A comprehensive program for the prevention, abatement, and control of water pollution is the goal of this statute. The State Water Pollution Control Council is hereby created and authorized to promulgate a program of water pollution control. The Council shall have the power to: (1) classify waters on the basis of beneficial use, (2) formulate water quality standards, and (3) supervise and regulate the State Board of Health in its administration of this Act. Further duties of the Board, and of the Department of Health, are herein detailed. Pollution of state waters and the operation, construction, or modification of waste disposal systems without a permit are prohibited. A 30-year period is established for prescriptive rights to discharge industrial wastes. Hearing and appeal procedures are herein delineated for orders of the Council abating pollution or classifying waters. (Madsen-Florida)
W71-10291

POLLUTION OF WATERS.
Utah Code Ann secs 73-14-1 thru 73-14-13 as amended (Supp 1969).

Descriptors: *Utah, *Administrative agencies, *Water pollution control, *Water quality control, Legislation, Water law, Legal aspects, Administration, Regulation, Administrative decisions, Water policy, Pollution abatement, Water pollution, Water quality, Water resources, Water permits, State governments, Standards, Environmental sanitation, Classification.

A committee on water pollution which shall take the place of the state water pollution control board is created within the division of health. The powers, duties, authority, organization, and administrative procedures of this committee are set forth. This legislation provides that pollution is a nuisance and lists activities that require a permit. Provision is made for the classification of waters, and relevant administrative requirements are explained. Enforcement procedures are detailed. Violation of the act or any order of the Committee shall constitute a misdemeanor. On request by the committee the attorney general shall bring an action for an injunction against any person violating the act or any order of the committee. Findings of the committee after due notice shall be prima facie evidence of the facts found therein. Procedures for appeal from decisions of the committee are set forth. This act provides additional and cumulative remedies and does not affect other remedies. The committee shall have the power to enter private or public property to investigate possible pollution. (Robinson-Florida)
W71-10292

FOULING OF WATERS A MISDEMEANOR.
North Dakota Century Code Ann secs 61-01-12 thru 61-01-14 as amended (Supp 1969).

Descriptors: *North Dakota, *Water pollution sources, *Water pollution control, *Waste disposal, Water quality, Water quality control, Wastes, Industrial wastes, Refuse, Sewage effluents, Gasoline, Oil wastes, Farm wastes, Cattle, Sheep, Hogs, Sewage disposal, Streams, Rivers, Public health, Administrative agencies.

Section 61-01-12 provides that the fouling of public waters by depositing gas tars or other refuse from any gas house into streams, rivers or sewers that empty into public waters is a misdemeanor. Section 61-01-13 provides the fouling of public waters with dead animals, offal, or other refuse by depositing same on the banks or in any lake or stream within the jurisdiction of the state is a misdemeanor punishable by a fine of from $20 to $100. Section 61-01-14 provides that section 61-01-13 shall be construed to include: (1) privies and privy vaults; (2) any stable, shed, pen, yard, or corral where farm animals are located within sixty feet of the top of any lake or stream; and (3) any slaughterhouse, graveyard or cemetery within eighty feet of these waters. However, in an emergency, these provisions do not prevent any municipality from dumping untreated sewage into these waters provided they are not determined detrimental to public health. (Rees-Florida)
W71-10293

WATER CONSERVATION COMMISSION.
North Dakota Century Code Ann secs 61-02-01 thru 61-02-04, 61-02-14, 61-02-15, 61-02-21, 61-02-24, 61-02-25 as amended (Supp 1969).

Descriptors: *North Dakota, *Water pollution control, *Administrative agencies, *Multiple-purpose projects, Pollution abatement, Water pollution treatment, Water quality control, Decision making, Legislation, Project planning, Water resources development, State governments, Sewage disposal, Sewage treatment, Impaired water quality, Odor, Color, Water pollution effects.

Water conservation, flood control, and the regulation and prevention of water pollution are found to necessitate the exercise of the soverign powers of the state and are affected with and concern a public purpose. The authority to effectuate this purpose is vested in a state water conservation commission. One of the commission's duties is to provide sufficient water flow for the abatement of stream pollution. One of its regulatory powers is the complete supervision and control of acts tending to pollute water courses. Pollution is defined as any alteration of the physical, chemical, or biological properties of water which is likely to create a nuisance or to be detrimental to any legitimate user, domestic or commercial, human, animal or aquatic. The commission is specially authorized to cooperate with federal and state agencies in investigating, planning, and handling any water for pollution control purposes. Although the pollution control activities of other state agencies must be authorized by the Commission, the Commission may not declare water polluted or approve waste disposal systems without the prior approval of the Department of Health. (Kohla-Florida)
W71-10294

CONCERNING WATER · POLLUTION, AND PROVIDING PENALTIES FOR VIOLATIONS RELATING TO POLLUTION OF STATE WATERS.
Colorado Laws 1970, ch 63, p 218-219, amending Colorado Revised Statutes secs 66-28-10, 66-28-12.

Descriptors: *Colorado, *Legal aspects, *Pollution abatement, *Water pollution control, Water pollution, Public health, Legislation, Waste disposal, Water conservation, Watercourses (Legal), Water policy, Water resources, Administrative agencies.

Any cease and desist order of specified state and local water pollution control agencies is subject to judicial rule. Any person violating a cease and desist order not under stay pending judicial review shall be subject to a civil penalty not to exceed $2500 per day. Willful violation of the provisions requiring notification of proposed discharge or reporting of discharges is a misdemeanor. This Act is necessary for the immediate preservation of the public peace, health and safety. (Gallagher-Florida)
W71-10295

POWER OVER WATER POLLUTION CONTROL AND PENALTY FOR POISONING OF WATERS.
South Dakota Compiled Laws, 1967, secs 34-1-17, 34-20-23 (1969).

Descriptors: *South Dakota, *Public health, *Water pollution control, *Poisons, Legislation, State governments, Administrative agencies, Legal aspects, Water law, Water pollution, Regulation, Domestic use, Permits, Water policy, Bodies of water, Water distribution (Applied), Water control.

The public health advisory committee shall, for the purpose of protecting the public health, have the power to regulate by requiring the taking out of licenses or other appropriate means, control, and, in proper cases, prohibit and suppress the pollution of streams and other waters and the distribution of

water for drinking or domestic use. Every person who willfully poisons any spring, well, or reservoir of water is punishable by imprisonment in the state penitentiary for a period not to exceed ten years, or in a county jail for not more than one year, or by a fine not exceeding five hundred dollars, or by both such fine and imprisonment. (Johnson-Florida)
W71-10296

TAX INCENTIVE FOR COMPLIANCE WITH WATER POLLUTION LAWS AND STANDARDS.
South Dakota Compiled Laws, 1967, secs 10-6-35.1 thru 10-6-35.3 (1969).

Descriptors: *South Dakota, *Assessments, *Nonstructural alternatives, *Taxes, Water pollution control, Legislation, State governments, Legal aspects, Structures, Water pollution, Standards, Planning, Water resources development, Tax rate, Financing, Government finance, Local governments.

All structures, or additions to existing structures, which have a value of one hundred thousand dollars or more and are added to real property by manufacturers or to agricultural real property are specially classified for the purpose of taxation. After construction such structures shall be valued in the usual manner; however, the board of county commissioners may adopt all or any part of a specified formula for taxable value. If adopted, the formula would limit the value to be taxed to twenty-five per cent of the taxable value in the first year after construction and to fifty percent in the second year. No real property shall qualify for this new construction tax incentive if the structure fails to comply with all air and water pollution laws and standards which are enacted and may be enacted from time to time by the state of South Dakota. (Johnson-Florida)
W71-10297

WATER POLLUTION CONTROL.
Hawaii Dept. of Health, Honolulu.

Public Health Regulations, Ch 37, as amended (1971). 6 p.

Descriptors: *Hawaii, *Water pollution control, *Permits, *Waste water disposal, Water quality control, Legislation, Legal aspects, Administrative agencies, State governments, Treatment facilities, Pollution abatement, Industrial wastes, Sewage disposal, Water zoning, Public health, Regulation.

These regulations provide for division of state waters into areas, with recommendations of water quality standards to protect the present and prospective best use of each water area. Without a permit, it shall be unlawful to: (1) discharge wastes into state waters so as to reduce water quality below applicable standards; (2) construct, modify, or operate any treatment works; or (3) construct or use any new outlet to discharge waste into state waters. Each application for a permit shall be accompanied by a statement of proposed activity or by a detailed plan of proposed or existing treatment works which discharge wastes. Applications for renewal need only reflect changes in permitted activities. Applications by operators of existing facilities to continue to discharge waste must be filed within 60 days of the adoption of standards by the Department of Health. No permit shall be issued unless it is shown to be in the public interest and unless the application contains a schedule of implementing actions to comply with the standards. Each permit shall be subject to revocation or modification if in the public interest. Violation of these regulations constitutes a misdemeanor. (Shelnut-Florida)
W71-10298

WATER QUALITY STANDARDS.
Hawaii Dept. of Health, Honolulu.

Public Health Regulations, Ch 37-A (1968). 8 p.

Descriptors: *Hawaii, *water quality control, *Sewage disposal, *Standards, Water utilization, Legislation, Legal aspects, Turbidity, Temperature control, Aquatic microbiology, Radioisotopes, Water zoning, Administrative agencies, State governments, Bank erosion, Industrial wastes, Regulation, Public health.

This regulation provides for the classification of coastal and fresh water areas in accordance with various uses to be protected in each class, and for the application of specific water quality standards to each area. It also provides for the establishment and termination of zones of mixing for the assimilation of municipal, agricultural and industrial discharges. The quality standards require that all waters, regardless of classification, shall be free of substances attributable to discharges or wastes to the following extent: (1) materials that will settle to form objectionable deposits; (2) floating debris, oil, and scum; (3) substances producing objectionable color, odor, taste, or turbidity; (4) materials which are toxic or which produce undesirable physiological responses in humans, fish, other animal life, or plants; and (5) substances which produce undesirable aquatic life. Also, all water shall be free from soil particles resulting from erosion or land involved in earthwork or cultivation and management of agricultural lands. Specific standards applicable to particular water areas involve microbiological requirements; pH levels; nutrient materials; dissolved oxygen; dissolved solids, salinity and currents; temperature; turbidity; and radionuclides. (Shelnut-Florida)
W71-10299

PLANT OPERATION (WASTE TREATMENT DISPOSAL REQUIREMENTS).
Oregon Dept. of Environmental Quality, Salem.

Oregon Administrative Rules Compilation ch 340, secs 42-005 thru 42-020 (1970). 2 p.

Descriptors: *Oregon, *Treatment facilities, *Operation and maintenance, *Water pollution control, Sewage, Industrial wastes, Public health, Water pollution, Pollution abatement, Administrative agencies, Regulation, Waste treatment, Waste disposal, Waste water disposal, Waste water treatment, Disinfection, Legislation, Legal aspects, Adoption of practices, Supervisory control (Power), State governments.

All sewage and industrial waste treatment and disposal plants shall be operated at their highest practical efficiency at all times unless written permission is granted by the Department of Environmental Quality. When any plant's operation creates unsatisfactory conditions in receiving waters, a public health threat, or nuisance conditions, the owner must within a specified time take corrective measures to eliminate such conditions. If the plant owner fails to comply, he must appear before the Department to show cause why an abatement order should not be issued immediately. The owner of any plant shall make such tests and keep such records as are necessary to prove the treatment operation effective. As evidence of effective operation, the Department may require a monthly operating report. Effective disinfection of sewage effluents shall be provided and shall be based upon Departmental determinations. If disinfection can not be accomplished, the Department must be informed immediately. Except in emergencies, approval shall be obtained from the Department before any sewage or industrial waste treatment plant is by-passed. (Gallagher-Florida)
W71-10300

STATE FINANCIAL ASSISTANCE TO PUBLIC AGENCIES FOR POLLUTION CONTROL FACILITIES.
Oregon Dept. of Environmental Quality, Salem.

Oregon Administrative Rules Compilation ch 340, secs 81-005 thru 81-050 (1971).

Descriptors: *Oregon, *Financing, *Treatment facilities, *Administrative agencies, Pollution abatement, Costs, State governments, Federal government, Grants, Loans, Bids, Administration, Use rates, Regulations, Legal aspects, Water pollution control.

The purpose of these regulations is to prescribe requirements and procedures for obtaining state financial assistance for planning and construction of pollution control facilities. Projects which are eligible for financial assistance are defined by state law. Any agency desiring to apply for financial assistance shall submit to the Department of Environmental Quality copies of each of the following: (1) federal sewage treatment works construction grant applications, (2) an agency resolution authorizing an official to apply for assistance, (3) a five year projection of estimated revenues and expenses, (4) an ordinance establishing sewer user rates and other charges for the proposed facilities, and (5) a legal opinion establishing the legal authority of the agency to enter into a loan or bond purchase agreement. Following approval of the application, the Department may enter into a loan or bond purchase agreement in a principle amount not to exceed 70% of eligible project costs. Federal or state grant funds must be available to complete the project. Upon receipt of the executed construction contract and the agreement, the Department will approve the final loan amount. (Shelnut-Florida)
W71-10301

A1A MOBILE HOME PARK, INC V BREVARD COUNTY (INJUNCTION TO PREVENT CONSTRUCTION AND OPERATION OF SEWAGE TREATMENT PLANT).
246 So 2d 126-131 (4th DCA Fla 1971).

Descriptors: *Florida, *Treatment facilities, *Local governments, *Odor, Waste treatment, Legal aspects, Judicial decisions, Remedies, Legislation.
Identifiers: *Nuisance.

Plaintiff mobile home park owner sought to enjoin construction and operation of a sewage treatment plant by defendant county. The treatment plant was to be constructed about fifty feet from plaintiff's park. Plaintiff contended that the plant would be noisy and malodorous, and would cause his tenants to depart. Furthermore, plaintiff contended that the site did not satisfy regulations of the State Board of Health and was selected in violation of defendant's own zoning ordinance. Defendant's answer raised the defense of laches, stating that the complaint was filed almost a year after construction was begun. The trial court granted defendant's motion for judgment on the pleadings. Although the District Court of Appeals noted that the plant was not a nuisance per se because it was legal at inception, the court held that plaintiff might prove that the plant constituted a nuisance. Hence it was held that the trial court erred in giving judgment on the pleadings. The court furthermore stated that the plant was a governmental activity, and that defendant did not have to comply with its own zoning ordinances. (Hart-Florida)
W71-10302

SEADADE INDUSTRIES, INC V FLORIDA POWER AND LIGHT CO (CONDEMNING LAND PENDING APPROVAL OF FACILITY BY POLLUTION CONTROL AUTHORITIES).

245 So 2d 209-217 (Fla 1971). 9 p.

Descriptors: *Florida, *Thermal pollution, *Condemnation, *Environmental effects, Electric power production, Electric powerplants, Electric power industry, Electric power, Eminent domain, Canals, Environment, Heated water, Pollutants, Thermal power, Thermal water, Water quality control, Water quality, Water pollution, Water pollution control, Water pollution sources, Legal aspects, Judicial decisions, Natural resources, Administrative agencies, Administrative decisions, State governments.

Plaintiff landowner sought to prevent defendant utility company from condemning its land. To cool new generators, defendant desired to draw water from Biscayne Bay and discharge the heated water through a canal to be condemned on plaintiff's lands. Plaintiff conceded defendant's condemnation authority, but contended that defendant had abused its discretion by condemning the property before the thermal discharge was approved by pollution control authorities. Plaintiff also asserted that the taking was not for a public purpose because it would cause thermal pollution. Defendant contended that the canal was necessary to generate power, that all statutory requirements had been satisfied, and that condemnation could not be prevented absent fraud or gross abuse of discretion. The Florida Supreme Court stated that a condemnation might be prohibited if it impaired the public interest or resulted from gross abuse of discretion. The protection afforded natural resources by the Florida constitution was noted. The court also observed, however, that completion of the project would be severely delayed if condemnation were prohibited until approval was given. Hence, the court balanced the conflict by holding that before condemnation plaintiff must show a reasonable probability of forthcoming approval, and demonstrate the condemnation would not result in irreparable harm should approval be denied. (Hart-Florida)
W71-10303

REGULATIONS ON POLLUTION ABATEMENT.
Maryland Dept. of Water Resources, Annapolis.

Regulations 4.1 thru 4.7. 11 p.

Descriptors: *Maryland, *Water pollution, *Pollution abatement, *Waste disposal, Water quality, Water pollution sources, Waste treatment, Waste identification, Industrial wastes, Sewage, Municipal wastes, Solid wastes, Liquid wastes, Oil wastes, Chemical wastes, Toxins, Effluents, Treatment facilities, Administrative agencies, Standards, Regulation, Inspection, Permits, Water properties.

Pollutants regulated by these sections are defined. The discharge of oil is prohibited unless in emergency or by unavoidable accident. The discharge of garbage into the waters of the state is entirely prohibited. The treatment and disposal of industrial wastes must meet specified requirements. Discharge of any wastes into Baltimore Harbor is allowed only under specified conditions. Toxic materials discharged by private, public or commercial operations are regulated by restrictions on use and procedures for obtaining approval. Requirements for the submission of reports and the issuance of certificates of approval describe: (1) who must submit reports; (2) when reports are to be submitted; (3) what data to include; and (4) how to get the Department of Water Resources' approval before commencing construction or alteration of industrial waste treatment works. (Rees-Florida)
W71-10304

REGULATION OF COMMERCIAL SHIPPING IN HARBORS TO CONTROL WATER POLLUTION.
Hawaii Revised Statutes sec 266-3 (1968).

Descriptors: *Hawaii, *Harbors, *Water pollution, *Water pollution control, Docks, Wharves, Bulkheads, Ships, Navigable streams, Oceans, Coasts, Shores, Beaches, Water pollution sources, Pollutants, Refuse, Wastes, Oil wastes, Fuels, Storage tanks, Water quality, Water quality control, State jurisdiction, Administrative agencies, Regulation, Administration, Legislation.

The director of transportation may promulgate, amend, and repeal rules and regulations which are concerned with: (1) the entering and mooring of ships in shore waters, harbors, and navigable streams of the state; (2) the examination and control of harbor wastes; (3) the embarking and disembarking of passengers and the handling of freight delivered for shipment or discharged on docks owned or controlled by the state; (4) the safety of docks, harbors, and waterfront improvements owned or controlled by the state; (5) preventing the disposal of refuse, garbage, and other substances liable to make harbors, shore waters, and navigable streams unsightly, unhealthy or unclean, or liable to fill up or shoal these waters; (6) preventing the escape of fuels or other oils into harbors, shore waters, and streams, either from a vessel or from pipes or storage tanks upon the land; and (7) the promotion of the public health and welfare by regulating the shore waters, shores, and beaches encumbered with easements in favor of the public, as defined in the Act. (Recs-Florida)
W71-10305

STATE WATER POLLUTION CONTROL.
Nevada Revised Statutes secs 445.040 thru 445.070 (1963).

Descriptors: *Nevada, *Water quality act, *Pollution abatement, *Administrative agencies, Legislation, Legal aspects, Water pollution control, Financing, Government finance, Grants, Loans, Projects, Interstate compacts, Water quality, Federal government.

The Department of Health and Welfare is designated as the state water pollution control agency. The Department is authorized to: (1) cooperate with federal and state agencies in all matters relating to water pollution, including the development of programs for preventing pollution and improving water quality; (2) apply for and receive funds under the federal Water Pollution Control Act; (3) approve project loans or grants authorized under the federal Act; (4) recommend measures for pollution abatement; and (5) consent on behalf of the state to federal pollution abatement suits. Interstate compacts relating to the control and reduction of pollution shall not be binding until approved by Congress. (Gallagher-Florida)
W71-10306

PROTECTION OF LAKE TAHOE WATERSHED.
Nevada Revised Statutes secs 445.080 thru 445.120 (1963).

Descriptors: *Nevada, *Watershed management, *Pollution abatement, *Permits, Legislation, Legal aspects, Lake basins, Watersheds (Basins), Sewage disposal, Environmental sanitation, Public health, Sewage treatment, Treatment facilities, Regulations, Water works, Water distribution (Applied), Building codes.

For the purpose of protecting Lake Tahoe, it is unlawful for anyone to construct without a permit: (1) any commercial or private building unless it does not require domestic water or sewage disposal, (2) any water supply system, or (3) any sewage disposal system. When the source of domestic water or place for sewage disposal would create a health hazard, the permit should be denied. Direct discharge of sewage or other wastes into any water body within the watershed is prohibited. If discharge into Lake Tahoe is considered necessary by the health division, the division shall issue a permit subject to the installation of the necessary sewage works to protect the lake. The division is empowered to make necessary rules, regulations, and inspections to carry out the purposes of the Act. (Gallagher-Florida)
W71-10307

COLORADO WATER POLLUTION CONTROL ACT OF 1966.
Colorado Revised Statutes, 1963 secs 66-28-1 thru 66-28-27 (Supp 1967).

Descriptors: *Colorado, *Water pollution control, *Administrative agencies, *Standards, Government finance, Legislation, Legal aspects, Administration, State governments, Local governments, Treatment facilities, Waste disposal, Water Quality Act, Public health, Water pollution sources, Water pollution treatment, Financing.

A water pollution control commission is hereby established. The commission shall have the following powers and duties: (1) supervision of water quality and waste discharge administration and enforcement; (2) adoption of water pollution prevention, control and abatement programs; (3) acceptance and supervision of federal, public, and private grants and loans; (4) modification and enforcement of rules and orders deemed necessary to prevent pollution; (5) certification of expenditures for treatment works and sewage systems; and (6) the exercise of all other incidental powers. The commission shall also determine all sources of pollution from periodic samples of state waters. It shall have authority to adopt water quality standards prescribing acceptable quality levels under criteria established by the Federal Water Pollution Control Act. Reasonable standards for waste discharge shall also be adopted. Failure to comply with commission orders or standards shall be unlawful. Notification of proposed or present discharges of waste shall be made, and approval is required before construction of domestic sewage treatment works. In discharging its responsibility with respect to treatment work projects, the commission may enter into contracts with municipalities. (Shelnut-Florida)
W71-10308

POWERS OF GOVERNING BODIES.
Colorado Revised Statutes Ann sec 139-32-1 (24) (1963).

Descriptors: *Colorado, *Water pollution control, *Financing, *Treatment facilities, Operating costs, Cost repayment, Construction costs, Legal aspects, Legislation, Government finance, State governments, Local governments, Sewage treatment, Grants, Industrial wastes, Pollution abatement, Public health.

The governing bodies of cities and towns are empowered to: (1) provide for water cleansing and purification and the draining and filling of ponds on private property whenever necessary to prevent or abate nuisances or water pollution; (2) receive aid from the federal government; (3) construct, improve, and extend sewerage facilities and treatment works; (4) issue general obligation bonds and revenue bonds; (5) provide that obligations may be sold to the state of Colorado or the United States at private sale; (6) cooperate with local and state bodies by contracts for joint construction, financing, and operation of facilities and treatment works; and (7) enter into joint agreements and accept contributions from industrial enterprises for construction, improvement and extension of facilities. When in the public interest and necessary for protection of the public health, a municipality may contract with industrial establishments for the operation, by the municipality, of a program to abate water pollution caused by industrial wastes, and for payment to the municipality of the costs incurred in operating the abatement facilities. (Shelnut-Florida)
W71-10309

LIABILITY FOR THE FLOODING OF MINE WASTES UPON ANOTHER'S PROPERTY.
Colorado Revised Statutes sec 92-24-3 (1963).

Descriptors: *Colorado, *Mining, *Sluices, *Flooding, Damages, Mine wastes, Mine water, Mine drainage, Water pollution, Water pollution sources, Water pollution control, Flood damage, Flood control, Real property, Land use, Legal aspects, Management, Legislation.

No person shall be allowed to flood the property of another with water, or wash down the tailings of his sluice upon the claim or property of another. It shall be the duty of every miner to take care of his own tailings, upon his own property, or become

responsible for all subsequent damages. (Rees-Florida)
W71-10310

AUTO CLUB OF ST PAUL V CITY OF WHITE BEAR LAKE (RIGHT OF CITY TO CONSTRUCT SEWAGE OUTLET INTO LAKE).
212 NW 909-910 (Minn 1927).

Descriptors: *Minnesota, *Cities, *Sewage disposal, *Water pollution, Sewage, Sewers, Outlets, Lakes, Cesspools, Septic tanks, Construction, Contracts, Effluents, Legal aspects, Judicial decisions, Land, Land tenure, Ownership of beds.

Plaintiff littoral landowner sought to restrain defendant city from signing a contract for the construction of a sewer system whose outlet was to be in the lake adjacent to plaintiff's property. Plaintiff contended that the lake waters were public waters and that operation of the sewage plant would create a nuisance. Defendant denied that the sewage system would constitute a nuisance and contended that the bed of the lake was private property. The trial court denied plaintiff relief, and the Supreme Court of Minnesota affirmed. The trial court was within its discretion in denying the writ. In affirming the trial court the supreme court noted that the effluent water would be as pure as the lake water. Thus the sewage discharge would not amount to a nuisance. (Duss-Florida)
W71-10311

WATER USE CLASSIFICATIONS AND WATER QUALITY STANDARDS.
Georgia Water Quality Control Board, Atlanta.

Rules of the Georgia Water Quality Control Board, Atlanta, Ga, June 13, 1967, Ch 730-3. 7 p.

Descriptors: *Georgia, *Water quality control, *Standards, *Water utilization, Water quality, Water temperature, Bacteria, Coliforms, Toxicity, Acidity, Alkalinity, Dissolved oxygen, Reasonable use, Recreation, Navigation, Water pollution, Water pollution control, Pollutants, Water pollution sources, Legal aspects, Legislation, Administrative agencies, Adoption of practices, Pollution abatement, Regulation.

Water quality standards and water use classifications are herein set forth for the purpose of preventing pollution, enhancing water quality, and protecting public health. Water use classifications are as follows: (1) drinking water supplies, (2) recreation, (3) fishing and propagation of aquatic life, (4) agricultural, (5) industrial, and (6) navigation. For each use classification, specific water quality standards are enumerated. Encompassed by these standards are: (1) bacteria content, (2) dissolved oxygen content, (3) pH range, (4) toxic waste content, and (5) temperature. Upon adequate justification the State Water Quality Control Board may permit deviations from such standards. The standards herein set forth shall not supercede secondary waste treatment requirements promulgated by the Board. (Madsen-Florida)
W71-10312

SANITARY CONTROL OF SHELLFISH.
Revised Code of Washington Ann secs 69.30.010 thru 69.30.900 (1962).

Descriptors: *Washington, *Shellfish, *Fish handling facilities, *Public health, Fisheries, Oysters, Clams, Fish management, Fish hatcheries, Fish harvest, Canneries, Aquiculture, Aquatic environment, Legislation, Permits, State governments, Administrative agencies, Regulation, Control, Water pollution, Water pollution sources, Wastes, Diseases, Fish diseases, Environmental effects, Fish populations.

To protect the public health, the state board of health is authorized to investigate the sanitation of shellfish growing areas and packing facilities. This board may issue rules and regulations to control such diverse aspects of shellfish production as: (1) shellfish growing areas; (2) barge sanitation; (3) sewage and waste water disposal of packing plants; (4) shell and garbage disposal; and (5) the handling, storage, and refrigeration of shellfish. The statute provides for: (1) an advisory committee composed of seven men from the regulated industries; (2) certificates of approval for growing areas and packing establishments to be issued for twelve months only; (3) immediate revocation of certificates upon violation of the state board's rules; (4) due process procedures upon a denial or revocation of certification and upon appeal from decisions of the state health director; (5) summary procedures to withdraw from sale shellfish sold in violation of this legislation; and (6) penalties for violations of these provisions. (Rees-Florida)
W71-10360

POLLUTION AS NUISANCE.
Alaska Statutes secs 46.10.010 thru 46.10.020 (1966).

Descriptors: *Alaska, *Water pollution control, *Water quality control, *Pollution abatement, Water pollution, Water quality, Legislation, Legal aspects, State governments, Regulation, Water supply, Water resources, Water sources, Water pollution sources, Water policy, Water conservation, Environmental sanitation, Pollutants, Bodies of water.

A person is guilty of creating a nuisance if he places a dead animal carcass, excrement, or any other offensive substance into, or in any other manner pollutes or impairs the quality of any spring, brook, pond, creek, branch, or well which may be used for domestic purposes. A person who refuses or neglects to abate such a nuisance upon order of a health officer is guilty of a misdemeanor, and the court shall assess judgment against him for the cost of abating the nuisance. The penalty for violation is a fine of not less than $10 nor more than $50, or by imprisonment for not less than 5 nor more than 25 days, or by both. (Robinson-Florida)
W71-10361

REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
Kansas State Dept. of Health, Topeka. Environmental Health Services.
For primary bibliographic entry see Field 05G.
W71-10369

REMOVAL OF SUBSTANCES POLLUTING WATERS.

California Fish and Game Code Ann sec 12015 (West 1958).

Descriptors: *California, *Pollution abatement, *Water pollution control, *Costs, Legislation, Legal aspects, State governments, Water quality, Water quality control, Water pollution, Fish conservation, Aquatic environment, Water law, Water policy, Water rights, Water injury, Environmental effects.

In addition to any other penalty imposed, anyone convicted of unlawfully polluting, contaminating, or obstructing waters to the detriment of fish life in such waters, shall either be required to remove any substance placed in the waters, which can be removed, that caused the prohibited condition or to pay the costs of such removal by the department. (Johnson-Florida)
W71-10378

FURNISHING POTABLE WATER.
Hawaii Revised Statutes secs 773.1 thru 773.3 (1968).

Descriptors: *Hawaii, *Potable water, *Public health, *Water quality control, Inspection, Administrative agencies, Regulation, Permits, Monitoring, Water quality, Domestic water, Water supply, Water sources, Public utilities, Water works, Water analysis, Water distribution (Applied), Environmental sanitation, Water purification, Pollutants, Contaminants, Water pollution control.

This Act regulates the distribution of potable water for human consumption. No organization, person, county, municipal, or state agency may furnish such water unless first obtaining a certificate from the department of health. The certificate is only issued when the water, its source of supply, and system of distribution are reasonably free from contamination and pollution. Upon receipt of written notice from the department of health that the water, source of supply, or system of distribution is unsuitable for potable purposes and injurious to the public health, no person, organization, county, or municipal or state agency shall continue to furnish such water for potable purposes. Any continued distribution after such written notice will subject the offender to a fine of not more than $100. (Rees-Florida)
W71-10435

SALE OF SHELLFISH FROM POLLUTED AREAS.
Texas Civil Statutes Ann art 4050f (1966).

Descriptors: *Texas, *Regulation, *Shellfish, *Water pollution, Administrative agencies, Administrative decisions, Legislation, Administration, Commercial shellfish, Legal aspects, Water pollution effects, Commercial fishing, Fishing.

The harvesting, transplantation, handling, packaging, and sale of shellfish are regulated by this Texas legislation. Polluted areas for shellfish harvesting are designated and closed by the Commissioner of Health on maps available to the public. Regulations for implementation of the Act may be promulgated by the Commissioner; violation of such regulations is a violation of the Act. Shellfish handling and packaging plants will be inspected and certified by the Commissioner when the requirements of the Act and regulations are satisfied. The certificate may be revoked for refusal to permit inspection or upon a finding that the plant does not satisfy the requirements established. Taking shellfish from polluted areas is prohibited, except that shellfish may be transplanted from polluted areas under supervision of the Parks and Wildlife Department. Furthermore, shellfish taken from polluted areas may be artificially purified pursuant to regulation. The following acts are unlawful: (1) selling shellfish not properly handled and packaged in a proper facility; (2) operation of an uncertified plant; and (3) selling shellfish in containers not bearing certification numbers. Violation is a misdemeanor, punishable by fine. Shellfish not complying with the Act may be seized and condemned. (Hart-Florida)
W71-10436

MINIMUM STANDARDS OF SANITATION AND HEALTH PROTECTION MEASURES.
Texas Civil Statutes Ann art 4477-1 (1966).

Descriptors: *Texas, *Public health, *Pollution abatement, *Environmental sanitation, Legislation, Legal aspects, State governments, Regulation, Pollutants, Pest control, Water pollution, Water pollution control, Water purification, Water policy, Water supply, Water sources, Water users, Water utilization, Water pollution sources, Waterflow, Sanitary engineering, Water treatment, Waste disposal, Waste water disposal, Waste water treatment.

A list of specified nuisances, including pollution of water supplies, is defined by this statute. Every person shall abate any such nuisance as soon as it comes to his knowledge. Sanitary and health regulations are also provided for the following places and activities: (1) unincorporated villages; (2) public buildings; (3) ice plants; (4) provision of

drinking water; (5) protection of public water supplies; (6) public water supplies and sewage systems; (7) correction of sanitary defects at water plants; (8) swimming pools and bath houses; (9) school houses and grounds; (10) tourist courts, hotels, inns, and rooming houses; (11) fair grounds, public parks, and amusement grounds; (12) industrial establishments; and (13) common carriers. Further provisions are established for the management of sewage plants and typhus and pest control. The penalty for violation of this act shall consist of a fine of not less than $10 nor more than $200, and each day of such violation constitutes a separate offense. These penalties shall not apply if such violator has exercised due diligence and has violated the act without intent. (Robinson-Florida)
W71-10437

IMPROVEMENT OF WATERCOURSES OR DRAINS WEST OF CASCADES.
Oregon Revised Statutes secs 549.210 thru 549.400 (1965).

Descriptors: *Oregon, *Drainage, *Watercourses (Legal), *Drainage programs, Condemnation, Eminent domain, Compensation, Legal aspects, Judicial decisions, Legislation, Real property, Water pollution, Water pollution control, Ditches, Water resources development, Administration.

Sixty per cent of the owners of lands contiguous to a drain or watercourse may petition the county court to improve the watercourse or drain. The court shall make a finding that 60 per cent of the affected landowners have signed the petition. Surveys of the necessary work, including plats, cost estimates, and assessment by the county engineer of damages to affected lands shall be directed by the court. Following submission of the engineer's report, and on ten days notice, the court shall conduct a hearing to review evidence both adverse to and supporting the proposed project, and shall determine if the project is in the public interest. When approved, the construction work may be performed by the property owner affected or the county under the engineer's supervision. Upon completion, the engineer shall file with the court a comprehensive report of the cost of the work which shall be assessed against the benefited lands. The improved watercourse shall be inspected annually, and the owner of the land where a defect exists must correct it. Property for the improvements may be acquired by condemnation. Appeals from an order authorizing improvements or assessing damages are permitted. Obstruction, pollution, or dumping refuse into any improved watercourse is prohibited. (Hart-Florida)
W71-10438

KLAMATH RIVER BASIN COMPACT.
Oregon Revised Statutes secs 542.610, 542.620 (1965).

Descriptors: *Oregon, *Interstate compacts, *Interstate commissions, *Water resources development, State governments, Federal government, United States, Interstate rivers, Water pollution, Water pollution control, Pollution abatement, Water quality, Water quality control, Legislation, Rivers, Water supply, Interstate, Water allocation (Policy), Water rights, Appropriation, Preferences (Water rights), Administration, Administrative agencies, Relative rights, Water storage.

The Klamath River Basin Compact has been ratified by the Oregon legislature, to be effective when ratified by California and approved by Congress. The Compact will promote intergovernmental cooperation between the two states and the federal government in systematic water resources development. Water use and distribution is governed by appropriation; rights vested before the Compact are recognized along with domestic and irrigation water. Each state may divert and store water, and all diversions must be measured. Each state may acquire property in the other state for diversion and storage under the Compact. The Commission is empowered to enforce water pollution control in the Klamath project; however, each state has primary responsibility for abating pollution within its boundaries. If a state fails to abate pollution when ordered to by the Commission, the order may be enforced in state or federal court. The state water pollution agencies shall furnish water quality data to the Commission. Each state and the federal government shall furnish a member of the Commission. Other portions of the Compact provide for: (1) administration, (2) Indian rights, (3) federal rights, (4) ratification, and (5) termination of the compact. (Hart-Florida)
W71-10439

REGULATION OF OIL AND GAS WELLS.
Kansas Statutes Ann secs 55-115 thru 55-142 (1964).

Descriptors: *Kansas, *Oil wells, *Well regulations, *Pollution abatement, Water pollution sources, Legislation, Legal aspects, Casings, Drilling, Regulation, Saline water intrusion, Subsurface waters, Well permits, Injection wells, Recharge wells, Rotary drilling, Conservation, Natural resources, Water pollution control.

Any oil or gas well operator must case or plug his well so as to prevent: (1) water intrusion into oil or gas-bearing rock, (2) salt or mineral water intrusion into water suitable for domestic use, and (3) salt water, oil, or other refuse from escaping by overflow or seepage. Regulations for drilling and abandonment of certain holes and wells to prevent pollution of natural resources are specified. A license is required to engage in the business of drilling seismic or core holes or plugging wells. The procedures for obtaining a license as well as the grounds for suspending or revoking a license are set out. The corporation commission is authorized to assess the costs of enforcing certain provisions of the Act. In abandoning a well, all operating structures must be removed as a matter of public policy. Before using secondary recovery methods of water flooding or repressuring, an operator must have his application approved. Regulations designed to prevent pollution of fresh water are established for the abandonment of wells drilled with cable tools or rotary equipment. Investigation and plugging of abandoned wells likely to cause pollution is authorized. (Gallagher-Florida)
W71-10440

DISPOSAL OF BRINES AND MINERALIZED WATERS.
Kansas Statutes Ann secs 55-1003 thru 55-1007 (1964).

Descriptors: *Kansas, *Waste disposal, *Oil wastes, *Permits, Legislation, Legal aspects, Waste water disposal, Injection wells, Oil industry, Administrative agencies, Water pollution, Pollution abatement, Public health, Standards, Water pollution sources, Project planning.

Before disposing of oil-field or gas-field brines and mineralized waters, plans and specifications for such disposal must be approved by the board of health and the corporation commission. The board of health shall determine if the plan protects water resources from preventable pollution. The corporation commission shall determine that the proposed method will not endanger gas or oil resources. If a permit is not granted the applicant may appeal. Where disposal is by injection well, the injection pressure may not exceed the maximum established by the board of health and entered in the permit. Disposal wells must comply with the minimum depth requirement established by the designated state agencies. Violation of these provisions constitutes a misdemeanor, and the attorney general or county attorney may seek injunctive relief. (Gallagher-Florida)
W71-10441

WATER AND SEWAGE.
Oklahoma Statutes Ann Title 63, secs 1-901 thru 1-914 (1964).

Descriptors: *Oklahoma, *Municipal water, *Sewage, *Sewage disposal, Water pollution, Water works, Legislation, Water law, Legal aspects, Reservoirs, Water pollution control, Water pollution sources, Pollution abatement, Wells, Well regulations, Sewers, Sewage treatment, Sewage effluents, Groundwater, Municipal wastes, Wastes, Sewage, Treatment, Administration.

The Board of Health is authorized by these sections to: (1) adopt standards and rules for the public water supply and for construction of water works, sewer systems, and sewage treatment plants; (2) make and enforce rules for control of sanitation on property within the drainage basins of reservoirs; and (3) maintain a laboratory to examine the public water supply. All plans for construction or alteration of water works, sewer systems, or sewage treatment plants must be approved by the Commissioner of Health. The Commissioner is authorized to issue appealable orders to abate pollution, and to issue permits to discharge sewage into state waters. Pollution of any waterbody, watercourse, or groundwater capable of being used for domestic purposes is declared unlawful. Abandoned or dry wells are required to be sealed to avoid pollution of groundwater. (Madsen-Florida)
W71-10442

WATER POLLUTION IN GENERAL.
Nevada Revised Statutes secs 445.010 thru 445.030 (1963).

Descriptors: *Nevada, *Water policy, *Pollution abatement, *Public health, Legislation, Legal aspects, Water pollution, Water quality control, Water pollution effects, Wildlife conservation, Water pollution sources, Water supply, Water utilization, Water conservation, Water delivery, Water quality, Water distribution (Applied).

Polluting the waters of the state so as to adversely affect the public health, wildlife, or livestock, or to render the water unpalatable or distasteful, is a misdemeanor. The attorney general, with the consent of the governor, shall commence and maintain such suits as may be necessary to prevent or restrain pollution of any public streams. Knowingly furnishing impure water for public or private use is a gross misdemeanor. (Gallagher-Florida)
W71-10443

POWERS OF TOWNS--WATER AND LIGHT.
Utah Code Ann secs 10-13-1 thru 10-13-26 (1962).

Descriptors: *Utah, *Domestic water, *Taxes, *Water conveyance, Legislation, Local governments, Legal aspects, Water law, Regulation, Jurisdiction, Water rights, Assessments, Pipelines, Irrigation systems, Water control, Water distribution (Applied), Construction, Planning.

The boards of trustees of towns are empowered to: (1) lay out, construct, open and keep in repair canals, water ditches, or water pipes to conduct water for artificial light and power purposes; (2) construct, own, and operate water pipes for irrigation, domestic, and other use by the inhabitants of the town; and (3) annually assess and collect a special tax not to exceed four mills on the dollar for such purposes upon all the property in the town. In order to protect from pollution water for culinary and domestic uses the trustees' jurisdiction over the stream or source from which the water is taken shall extend for ten miles above the point from which it is removed from the natural stream. (Johnson-Florida)
W71-10444

PROTECTION OF FISH THROUGH POLLUTION CONTROL.
Idaho Code sec 36-1101 (1961).

Descriptors: *Idaho, *Water pollution, *Fishkill, *Water pollution effects, Wildlife conservation, Water quality control, Water pollution sources, Water pollution control, Saw mills, Sawdust, Pollutants, Poisons, Fish toxins, Explosives, Fish conservation, Quartz, Settling basins, Dams, Legislation, Administrative agencies, Regulation, Legal aspects.

It shall be unlawful for persons operating sawmills or any other persons to dump sawdust, chemicals, or other substances which may tend to destroy or drive away any fish into any stream or lake. It shall be unlawful to kill any fish by means of poisons or explosives. If it shall become necessary for any individual to use explosives for internal improvement in any stream or lake, prior approval must be obtained from the fish and game department or deputy warden. Any quartz mill operating on a stream or lake shall construct suitable dams for settling purposes to prevent harmful chemicals from flowing into the water. (Smiljanich-Florida)
W71-10445

POLLUTION OF UNDERGROUND WATER.
Wyoming Statutes secs 41-121, 41-126 (1959).

Descriptors: *Wyoming, *Groundwater, *Water pollution, *Water pollution control, Pollution abatement, Subsurface waters, Percolating water, Underground, Wells, Saline water intrusion, Water pollution sources, Mineralogy, Industrial wastes, Municipal wastes, Sewage, Water quality control, Water pollution treatment, Administrative agencies, Legislation, Public health, Regulation, Legal aspects, Administration.

An Act relating to underground water provides that pollution of underground water means any impairment of the natural quality of such water, however caused, including impairment by salines, minerals, industrial wastes, domestic wastes, or sewage. Underground water refers to any water beneath the surface of the land or the bed of any stream, lake, or other body of surface water. In the administration and enforcement of this Act the state engineer is authorized to require the abatement of any condition, or the sealing of any well, responsible for admitting polluting materials into an underground water supply, and is further authorized to perform necessary duties relating to investigation, regulation, and construction of wells in order to conserve the state's underground water resources. (Smiljanich-Florida)
W71-10446

HEALTH MENACES.
Arizona Revised Statutes Ann secs 36-601, 36-602 (1956).

Descriptors: *Arizona, *Public health, *Administration, *Environmental sanitation, Legal aspects, Diseases, Legislation, Water pollution, Pest control, Organic wastes, Cesspools, Septic tanks, Soil contamination, Sanitary engineering, Sewage disposal, Waste water treatment, Waste disposal.
Identifiers: *Public nuisance.

The following conditions are specifically declared public nuisances: (1) breeding places for disease-carrying pests, (2) spoiled food or drink intended for human consumption, (3) any business dealing with food sold or served to the public which is maintained in an unsanitary condition, (4) any unsanitary place controlled by government, (5) any organic wastes handled in a manner which allows the transmission of disease, (6) containers that allow leakage of organic wastes, (7) ectoparasites in sleeping accommodations, (8) overflowing cesspools or septic tanks, (9) pollution of domestic waters, (10) common drinking cups or towels unless sanitized after each use, (11) buildings maintained in a filthy condition, (12) spilling or urinating in public areas, (13) using organic waste waters for fertilizing or irrigating without government approval, (14) public assemblies without adequate sanitary facilities, (15) unsanitary lodging establishments, and (16) disposing of trash in an unauthorized manner. Where there is a public nuisance, provision is made for notice and hearing. If the party fails to comply with a cease and desist order, the commissioner of public health may seek injunctive relief. The local health authority can remove nuisances on private property at the owner's expense if the owner doesn't comply. (Gallagher-Florida)
W71-10447

POLLUTION OF WATERS; MAINTENANCE OF THINGS OFFENSIVE OR UNHEALTHFUL; PUNISHMENT.

Arizona Revised Statutes Ann sec 13-603 (1956).

Descriptors: *Arizona, *Water pollution control, *Water supply, *Waste water (Pollution), Water pollution, Water pollution sources, Pollution abatement, Water policy, Legislation, Water law, Legal aspects, Water resources, Water sources, Water rights, Environmental sanitation, State governments, Waste disposal, Waste water disposal, Water quality, Water quality control, Pollutants.

It is unlawful to place an animal carcass or offal from any type of slaughter house into a stream, pond, lake or reservoir. The placement of a water closet or privy or the carcass of a dead animal upon the borders of a stream, pond, lake, or reservoir which constitutes a public water supply is unlawful. It is also unlawful for one to allow a water closet or privy, carcass of a dead animal, or offal to remain upon the borders of such a public water source within the boundaries of his own land if offensive substances drain into the water. Livestock shall not be penned on, over, or on the borders of such water if such placement pollutes the water. Bathing in any stream, pond, lake or reservoir from which water is drawn for a public water supply is forbidden. No one shall foul or pollute a public water source by any other means not listed in the statute. Owners of water closets, privies, or cesspools in a community shall not permit them to become unhealthful or offensive. A violation of any provision of this statute is a misdemeanor. (Robinson-Florida)
W71-10448

POLLUTING WATER.
New Mexico Statutes Ann sec 40A-8-2 (1953).

Descriptors: *New Mexico, *Regulation, *Legislation, *Water pollution control, Water pollution, Bodies of water, Streams, Wells, Rivers, River regulation, Water utilization, Public health, Water quality, Legal aspects, Impaired water quality, Pollution abatement.

Polluting any body of water is declared to be a public nuisance. Polluting water is defined as knowingly and unlawfully introducing any object or substance into any body of water, thereby causing it to be offensive or dangerous for human or animal consumption or use. Any such act of polluting is a misdemeanor. (Horwitz-Florida)
W71-10449

6F. Nonstructural Alternatives

FLOOD PLAIN INFORMATION, JAMES RIVER AND TRIBUTARIES, SPRINGFIELD, MISSOURI, PART 2.
Corps of Engineers, Little Rock, Ark.
For primary bibliographic entry see Field 04A.
W71-09972

FLOOD PLAIN INFORMATION, SAN JACINTO RIVER (SAN JACINTO TO RAILROAD CANYON), RIVERSIDE COUNTY, CALIFORNIA.
Corps of Engineers, Los Angeles, Calif.
For primary bibliographic entry see Field 04A.
W71-09973

MISSOURI WATER PLAN, STATE LAWS, POLICIES AND PROGRAMS PERTAINING TO WATER AND RELATED LAND RESOURCES.
Missouri Water Resources Board, Jefferson City.
For primary bibliographic entry see Field 06E.
W71-10270

6G. Ecologic Impact of Water Development

INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
Huron River Watershed Council, Ann Arbor, Mich. Inland Lakes and Shoreland Project.
For primary bibliographic entry see Field 04A.
W71-09945

IMPLEMENTATION OF NATIONAL ENVIRONMENTAL POLICY.
For primary bibliographic entry see Field 06E.
W71-10285

07. RESOURCES DATA

7A. Network Design

EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
Arizona Univ., Tucson.
Lucien Duckstein, and Chester C. Kisiel.
Water Resources Bulletin, Vol 7, No 3, p 592-604, June 1971. 13 p, 1 fig, 3 tab, 18 ref. OWRR Project B-007-ARIZ (6).

Descriptors: *Data collections, *Systems analysis, *Network design, *Statistical methods, *Decision making, Conjunctive use, Hydrologic data, Planning, Water management (Applied), Mathematical models, Model studies, Optimization, Economics, Cost-benefit analysis.
Identifiers: *Decision theory.

The efficiency of hydrologic data collection systems is relevant to solution of environmental problems, scientific understanding of hydrologic processes, model-building and management of water resources. Because these goals may be overlapping and non-commensurate, design of data networks is not simple. Elements of error or risk in such networks are: (a) choice of variables and mathematical model for the same process; (b) accuracy of model parameter estimates; (c) acceptance of wrong hypothesis or rejection of correct hypothesis; and (d) economic losses associated with error. Of these four, the classical hypothesis-testing method is specifically evaluated in terms of costs of errors for simple and composite hypothesis; mathematical models for these economic analyses also include costs of sample data and costs of waiting while new data are obtained. An illustrative computational example illustrates the hypothesis that natural recharge might be augmented by a system of pumping wells along an ephemeral channel. The relationship of the hypothesis-testing method to Bayesian decision theory is discussed; decision theory offers a more comprehensive framework for design and use of hydrologic data networks. (Knapp-USGS)
W71-10314

7B. Data Acquisition

DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
Du Pont de Nemours (E.I.) and Co., Aiken, S.C. Savannah River Lab.
For primary bibliographic entry see Field 02J.
W71-09950

AN ELECTROMETRIC METHOD FOR THE DETERMINATION OF SOIL MOISTURE,
Maharashtra Association for the Cultivation of Science, Poona (India); and J.N. Agricultural Univ., Jabalpur, India, Instrument Development and Service Center.
For primary bibliographic entry see Field 02G.
W71-10012

ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
Department of Energy, Mines and Resources, Ottawa (Ontario). Inland Waters Branch.
For primary bibliographic entry see Field 02C.
W71-10049

A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
Memorial Univ. of Newfoundland, St John's. Dept. of Biology; and Laval Univ. Quebec. Departement de Biologie.
For primary bibliographic entry see Field 05C.
W71-10066

DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
Department of Energy, Mines and Resources, Burlington (Ontario). Inland Waters Branch.
Yiu-Kee Chau.
Available from Department of Energy, Mines and Resources, Burlington, Ontario, Canada, Inland Waters Branch, Reprint Series No 26, Talanta, Vol 15, p 421-424, 1968. 1 fig, 1 tab, 4 ref.

Descriptors: *Trace elements, *Spectroscopy, *Instrumentation, Flame photometry, Spectrophotometry, Separation techniques.
Identifiers: *Scandium, *Atomic absorption spectroscopy, Scandium radioisotopes, Extraction, Sensitivity enhancement, Complexation, Anionic interference.

For the analysis of trace elements, atomic absorption spectroscopy, because of its high sensitivity, minimum sample preparation and relative freedom from interference, has become an ideal technique. Trace quantities of scandium can be determined by using nitrous oxide and acetylene mixtures to provide a non oxidizing high temperature flame. Studies of optimum operational conditions and enhancement of sensitivity by the use of organic solvents and extraction of complexes are described. Scandium 46 was used to establish optimum extraction conditions. A sensitivity of 0.06 ppm of scandium was observed when using extraction with butyl alcohol containing 2.5% of oxine at pH 1-4 and atomic absorption was measured with an acetylene nitrous oxide flame. Variation in the flame mixture resulted in great variation of the absorption responses; flame temperature was critical. The slit width was chosen to give maximum absorption signal and to compromise between sensitivity and reproducibility of readings. The aqueous solution of EDTA is a better solvent than alcohols and takes up most inorganic scandium compounds. (Jones-Wisconsin)
W71-10072

ATOMIC ABSORPTION DETERMINATION OF MICROGRAM QUANTITIES OF MOLYBDENUM IN LAKE WATERS,
Department of Energy, Mines and Resources, Burlington (Ontario) Canada Centre for Inland Waters.
Y. K. Chau, and K. Lum Shue-Chan
Available from Department of Energy, Mines and Resources, Burlington, Ontario, Canada, Inland Waters Branch, Reprint Series No 58, Analytica Chimica Acta, Vol 48, p 205-212, 1969. 1 fig, 4 tab, 16 ref.

Descriptors: *Molybdenum, *Lakes, *Trace elements, Measurement, Spectroscopy, Flame photometry, Separation techniques, Instrumentation, Hydrogen ion concentration, Great Lakes, Analytical techniques.
Identifiers: *Atomic-absorption, Sensitivity, Complexation, Extraction, Interference.

In investigations of geochemical, biochemical, and industrial processes in the Great Lakes, determination of certain trace elements in water and sediments is significant. Among these, molybdenum is studied as a biologically active element for growth and as a micronutrient. Complexation and solvent extraction followed by atomic absorption spectroscopy provides a simple, sensitive, and accurate technique for analysis. The method is described. The extraction by various complexing agents was studied and their atomic absorption sensitivity compared; oxine and dithiol are among the most sensitive. Optimum conditions for oxine and the interference of certain elements in atomic absorption are reported. Molybdenum was extracted directly from 100 ml of water by oxine in methyl isobutyl ketone and determined by atomic absorption spectroscopy with a nitrous oxide acetylene flame. The precision of the method was tested by replicate analyses of a lake water sample and spiked molybdenum-free water. The coefficient of variation for spiked lake water and natural lake water containing 20 micrograms molybdenum per liter and 5.56 micrograms molybdenum per liter were found to be 1.8% and 4.0% respectively. Sensitivity of the method is 1 ppb. (Jones-Wisconsin)
W71-10077

TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II): (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
University of Southern California, Los Angeles. Dept. of Biological Sciences.
For primary bibliographic entry see Field 05C.
W71-10082

A SIMPLE, SENSITIVE UNDERWATER PHOTOMETER,
Michigan State Univ., Hickory Corners. W.K. Kellogg Biological Station.
Peter H. Rich, and Robert G. Wetzel.
Limnology and Oceanography, Vol 14, No 4, p 611-613, 1969. 2 fig, 4 ref. AEC Contract AT (11-1)-1599.

Descriptors: *Light intensity, *Photometry, Instrumentation, Underwater, Electrical equipment, Measurement.
Identifiers: Linearity, Subglacial waters.

The constructed underwater photometer utilizes the voltage-splitter principle with adjustable circuit steps instead of a potentiometer. This modification permits a linear response of the microammeter for a given range of photocell resistance. The photometer was calibrated against constant incandescent source in conjunction with a recording spectroradiometer, and a commercially produced underwater photometer. The instrument is particularly well adapted for recording very low light intensities of deep hypolimnic compensation zones and subglacial waters. It permits better discrimination of incident and reflected light. (Wilde Wisconsin)
W71-10089

DIGESTION OF OYSTERS FOR THE DETERMINATION OF MERCURY,
Gulf Coast Water Hygiene Lab., Dauphin Island, Ala.
For primary bibliographic entry see Field 05A.
W71-10092

SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
Rice Univ., Houston, Tex.
For primary bibliographic entry see Field 02J.
W71-10332

NONDESTRUCTIVE WATER CONTENT DETERMINATION,
Tippetts-Abbett-McCarthy-Stratton, New York; and Brooklyn Coll., New York. Dept. of Geology.
For primary bibliographic entry see Field 02G.
W71-10338

AUTOMATION FOR SMALL IRRIGATION PROJECTS,
Bureau of Reclamation, Bismarck, N. Dak.
For primary bibliographic entry see Field 03F.
W71-10391

CHAPTER III. Sediment measurement techniques3 reservoir deposits.
American Society of Civil Engineers, New York.

Proceedings American Society of Civil Engineers, Journal of the Hydraulics Division, Vol 96, No HY12, p 2417-2446, Dec, 1970. 30 p, 25 fig, 1 tab, 19 ref, append.

Descriptors: Sedimentation, *Sediment deposits, Reservoir capacity, Sediment distribution, *Sediments, *Sediment sampling, Bibliographies, Sediment samplers, *Reservoirs, Reservoir silting, Computation, Sonar, Measurement, Surveying instruments, Methodology, Surveys, Gamma probes, Sounding, Fathometers, Procedures, *Reservoir surveys.
Identifiers: *Sedimentation surveys.

A reservoir sediment survey includes laboratory analysis of sediment samples, field measurements, and processing and analysis of data from a reservoir sedimentation investigation. Sediment surveys determine the volumetric reduction in a reservoir, and furnish other valuable information and data such as how sediment deposits are distributed in the reservoir and what changes the stream channel undergoes because of sediment transport and deposition. Field data collected during surveys are analyzed to include the specific weights and grain-size distribution of the deposits, sediment yield rates of the drainage area, reservoir trap efficiencies, and density currents. Guidelines are listed for determining how frequently the surveys should be run. Field equipment is described, including sonic sounders, distance measuring apparatus, and auxiliary equipment. Piston core, gravity type, gamma probe, and other types of sediment deposit samplers are illustrated and described. Contour and range methods of reservoir sediment surveys are explained. Several methods of reservoir capacity computations are presented mathematically and graphically. (USBR)
W71-10392

CAPACITANCE TECHNIQUES FOR RADIAL DEFORMATIONS,
Purdue Univ., Lafayette, Ind; and Baghdad Univ. (Iraq).
For primary bibliographic entry see Field 08D.
W71-10407

THE MEASUREMENT OF ROCK STRESS CHANGES USING HYDRAULIC BOREHOLE GAGES,
Terrametrics, Inc., Golden, Colo.
For primary bibliographic entry see Field 08E.
W71-10408

NEW TOOLS FOR NEW AND OLD WELLS,
Leggette, Brashears and Graham, New York.
For primary bibliographic entry see Field 08A.
W71-10422

TEMPERATURE SURVEYS: THE ART OF INTERPRETATION,
Worth Well Surveys, Inc., Midland, Tex.
For primary bibliographic entry see Field 03B.
W71-10427

ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
Dresser Atlas, Houston, Tex.
For primary bibliographic entry see Field 03B.
W71-10428

7C. Evaluation, Processing and Publication

NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,
Illinois State Water Survey, Urbana.
Chih Ted Yang, and John B. Stall.
Water Resources Research, Vol 7, No 3, p 709-712, June 1971. 4 p, 2 fig, 1 tab, 5 ref. OWRR Project B-023-ILL (3).

Descriptors: *Channel morphology, *Distribution patterns, *Profiles, *Maps, Mapping, Topography, Cross-sections, Hydrography, Terrain analysis, Measurement, Surveys.
Identifiers: *Stream order.

The Strahler stream order assigned to a particular stream segment depends on the scale of the topographic map used in ordering the stream network. However, the Horton-Strahler bifurcation ratio of stream number, stream length ratio, and stream concavity are found to be independent of map-scale. The coefficients in Horton's laws obtained from a map system of one scale can be transferred to a map system of another scale if the stream order difference between the two map systems is given. Theoretical and equilibrium longitudinal stream bed profiles as derived in this paper are shown to be independent of map scale and can be compared favorably with an actual profile obtained from a topographic map of any scale. (Knapp-USGS)
W71-10010

OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
Missouri Univ., Rolla. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02E.
W71-10018

COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
Agricultural Research Service, Beltsville, Md. Hydrograph Lab.
For primary bibliographic entry see Field 02A.
W71-10021

HYDROLOGICAL MAPPING AND THE IHD,
U. S. National Committee of the IHD (NAS-NRC), Washington, D.C.
L. A. Heindl.
Nature and Resources, Vol 7, No 1, p 15-19, March 1970. 5 p, 2 fig.

Descriptors: *Mapping, *Maps, *International Hydrological Decade, *Hydrogeology, Data collections, Publications, Standards, Conferences, Planning.
Identifiers: *Hydrological mapping.

In response to the need for compatibility and standardization, the third session of the Co-ordination Council for the IHD established a Working Group on Hydrological Maps and asked national committees for the IHD to assist the group to promote the development of hydrological mapping and the use of standardized international symbols and legends. As a starting-point, the working group suggested that a possible minimal requirement for map data included the following: (1) Annual water yield showing seasonal variations, (2) Variability and extremes of water yield, (3) Hydrometric and hydrometeorological networks with index to available data, (4) Annual and seasonal precipitation, and variability of precipitation, (5) Annual and seasonal evaporation, and variability, and (6) Ground water. (Knapp-USGS)
W71-10030

A STATISTICAL DATA PLAN FOR BOMEX,
Booz-Allen Applied Research, Inc. Washington, D.C.
For primary bibliographic entry see Field 02B.
W71-10033

CROSS SPECTRAL ANALYSIS OF PRECIPITATION AND STREAMFLOW DATA SYSTEMS,
Nevada Univ. System, Reno, Desert Research Inst., Center for Water Resources Research.
Vulli L. Gupta.
Available from the National Technical Information Service as PB-201 057, $3.00 in paper copy, $0.95 in microfiche. Paper presented at the Fall National Meeting of the American Geophysical Union, San Francisco, December 1970. 16 p, 12 fig, 7 tab, 5 ref. OWRR Project A-029-NEV (1).

Descriptors: *Time series analysis, *Rainfall-runoff relationships, *Fourier analysis, Statistical methods, Frequency analysis, Streamflow forecasting, Numerical analysis, Statistics, Data collections, Data processing.
Identifiers: *Cross spectral analysis.

A computer program was developed to derive spectral parameters from assembled hydrologic data. Parameters from cross spectral analysis include gain, phase, and coherence. A supplementary computer program analyzes data for significant harmonics in accordance with principles of a generalized Fourier-harmonic rationale. Spectral characteristics of precipitation reveal significant peaks on annual and semi-annual cycles. Peaks in streamflow spectral description are less marked. Close agreement between characteristics is evidenced for large basins, whereas small basins reflect noticeable divergence. This supports the observation that small drainage basins are more sensitive than large basins in responding to precipitation in terms of water yield. Generalized harmonic analyses for precipitation and streamflow reveals that time-variation of precipitation is significantly concentrated in first three out of six harmonics, whereas streamflow description would necessitate five out of six harmonics. (Knapp-USGS)
W71-10037

THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
Egyptian Desert Inst., Cario.
For primary bibliographic entry see Field 02F.
W71-10053

SPECIES DIVERSITY SPECIES ABUNDANCE OF FISH POPULATIONS: AN EXAMINATION OF VARIOUS METHODS,
Maryland Univ., Prince Frederick. Natural Resources Inst.
Andrew J. McErlean, and Joseph A. Mihursky.
Natural Resources Inst. Contribution No. 368. Proceedings of the 22nd Annual Conference of the Southeastern Association of Game and Fish Commissioners, p 367-372, 1969. 7 fig, 2 tab, 11 ref. OWRR Project No A-002-MD (7).

Descriptors: *Data processing, *Statistics, *Numerical analysis, *Evaluation, Data collections, Mathematical models, Statistical methods, Fish management.
Identifiers: *Diversity index, Species diversity.

Twenty sets of fish collection data were used to compare seven diversity indices. The data sets were chosen to represent the wide variation in habitat, ecological condition, salinity and other factors encountered in fishery work. Cross comparisons of several index rankings were made and the dependencies of the various indices are discussed. Variation in index score with number of species and with sample size was examined. Results indicate that four indices may be applied to fishery work. (LeGore - Washington)
W71-10210

EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
Arizona Univ., Tucson.
For primary bibliographic entry see Field 07A.
W71-10314

ANALYSIS OF SEDIMENTATION DATA,
Norges Tekniske Hoegskole, Trondheim. Institutt for Anleggsdrift og Havnebygging.
For primary bibliographic entry see Field 02J.
W71-10315

RECURRING TEXAS DROUGHTS,
Texas Water Development Board, Austin.
T. Carr, Jr.
Water for Texas, Vol 1, No 7, p 7-10, April 1971. 2 fig, 8 ref.

Descriptors: *Droughts, *Cycles, *Texas, *Climatic data, *Meteorological data, Environmental factors, Limiting factors, Heat, Storms, Wet seasons, Dry seasons, Statistical methods, Probability, Weather data, Correlation analysis, Solar radiation, Data processing, Analysis, Variability, Precipitation (Atmospheric), Air-earth interfaces, Air-water interfaces.
Identifiers: Texas Upper Coast, Predictions, Extrapolation.

Prolonged drought is a disastrous phenomenon, where suffering, endurance, death or migration to tolerable environments are encountered. Some regions are historically susceptable to drought, either randomly or in definite cycles. Sources of heat, drought definitions, tropical-storm effects on the Texas Upper Coast, and 'wet' and 'dry' years are discussed. The major causes of drought in Texas can be described, but the combination of forces, actions and interactions are more difficult. Drought prediction is based on extrapolation of past record into the future, randomness or statistical probabilities of drought-producing weather factors, and correlation of dry weather with solar radiation. Electronically processed climatic records (computer analysis of data) might be profitable in (1) relating droughts to solar activity, (2) examining climatic variations and atmospheric-oceanic interaction, and (3) investigating the inverse relationship between world-wide temperature and precipitation. Figures show a windmill well, and cyclic climatic trends in Texas and other areas. (Popkin - Arizona)
W71-10410

08. ENGINEERING WORKS

8A. Structures

PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
Connecticut Univ., Storrs. Dept. of Civil Engineering; and Rocky Mountain Hydraulic Lab., Allensport, Colo.
Chesley J. Posey.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY 7, Paper 8230, p 1011-1016, July 1971. 6 p, 3 fig, 8 ref.

Descriptors: *Scour, *Flow around objects, *Offshore platforms, *Structures, *Hydraulic models, Erosion, Waves (Water), Beaches, Surf, Permeability, Bottom sediments.
Identifiers: *Underscour.

This paper summarizes the results of several investigations of underscour, which can endanger offshore structures. Reproduction at model scale of an unusual pattern of scour, a general lowering of the seabed under and around the whole structure, as first observed by divers, led to improved understanding of the phenomenon. Theoretical studies predicting this type of erosion, which contrasts with the usual bridge-pier type, are cited. Flow through the permeable seabed from high pressure

zones under wave crests to low pressure zones under the troughs assists the local velocity in rapidly eroding the seabed. The use of reverse filters is indicated. Model tests, special severe erosion studies, and experience with offshore installations show how effective and economical protection can be obtained. (Knapp-USGS)
W71-10175

BLAST-FRACTURING,
Western Co., Richardson, Tex.
G. R. Dysart, A. M. Spencer, and A. L. Anderson.
Published by American Petroleum Institute, 300 Corrigan Tower Bldg., Dallas, Texas 75201. Drilling and Production Practice (1969): Completion or Re-completion Treatment; p 68-76. 2 tab, 8 fig, 19 ref.

Descriptors: *Aquifer characteristics, Groundwater, Oil industry, Rock mechanics, Rock properties.
Identifiers: *Aquifer stimulation, *Explosives (Wells), *Fracturing (Wells), Fracture prediction, Hydraulic fracturing.

In December 1967, El Paso Natural Gas Company, in conjunction with the U.S. Government, detonated a thermonuclear device underground (Project Gasbuggy) to create extensive fracturing in the Pictured Cliffs formation. This form of explosive fracturing is a continuation of one of the first well-stimulation techniques - nitro shooting. Nitro shooting was a dangerous process in all aspects - storage, handling, and application. In recent years new high-energy explosives have been developed which are safe to handle, temperature-insensitive, and can be produced in various plasticites so they can be made to conform to well-born or fracture surfaces. These explosives are very applicable to explosive fracturing of oil gas wells and water wells. Renewed interest in explosive fracturing has come about because hydraulic fracturing is not always successful in fields with unconnected permeability streaks. Explosive fracturing can connect these streaks with flow channels; and then, if desired, these streaks may be hydraulically fractured through these flow channels. Experience may show conventional high-explosive fracturing to be more convenient and less costly than hydraulic fracturing for certain applications and, in some cases, the only way a reservoir can be stimulated. (Campbell-NWWA)
W71-10418

SHOOTING ROCK WELL INVOLVES RISKS.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.
For primary bibliographic entry see Field 04B.
W71-10419

BEST WELL DEPTH IN CRYSTALLINE ROCKS,
Universal Oil Products Co., St. Paul, Minn. Johnson Div.
S. N. Davis, and L. J. Turk.
Johnson Drillers Journal, Vol 41, No 4, p 1-5, Jul-Aug 1969. 9 fig, 10 ref.

Descriptors: *Water wells, *Drilling, Rotary drilling, Crystalline rocks.
Identifiers: *Igneous rock drilling, *Metamorphic rock drilling, Weathered zones, Optimum well depth.

Water quality, local regulations, aesthetic considerations and other factors also are commonly important in deciding upon well depth in addition to simple economic or geological analyses. The authors have attempted to give some quantitative expression to just one decision-making step in one type of water-bearing material. This expression is summarized in the following conclusions: (1) water-bearing characteristics of most crystalline rocks are primarily controlled by weathering and structure. Rock type alone is commonly of secondary importance. (2) Drilling in crystalline rocks encounters highly variable amounts of water. In unweathered rock, from 5 to 15 per cent of the wells are failures, median yields are less than 8 gpm. but about 10 per cent can be expected to have yields of 50 gpm or more. (3) Water production per foot of well decreases rapidly with increase in well depth. Average yields per foot of well are 0.23 to 0.3 gpm at 100 ft, but only 0.013 to 0.04 gpm at 1,000 ft. Average injection rates per foot of drill hole at 100 psi pressure are 0.11 to 0.4 gpm at 100 ft but only 0.014 to 0.038 gpm at 1,000 ft. (4) Optimum depth of water wells in crystalline rocks is determined largely by cost factors unless the geologic factor is known in detail. (5) Rough estimates suggest that the depth of single domestic wells should be less than 150 to 250 ft, and wells of larger production should be less than 600 ft. In many places, the optimum depth of domestic wells is less than 100 ft. (Campbell-NWWA)
W71-10420

ESTIMATING WATER WELL SPECIFIC CAPACITY UTILIZING PERMEABILITY OF DISTURBED SAMPLES,
Patchick (Paul F.), Pebble Beach, Calif.
P. F. Patchick.
American Water Works Association Journal, Vol 59, No 10, p 1292-1302, Oct 1967. 4 tab, 4 fig, 19 ref.

Descriptors: *Water wells, *Drilling, Wells, Rotary drilling, Specific capacity, Permeability, Screens.
Identifiers: *Water well contractor, Effective transmissability, Well yield prediction, Drawdown.

Water supply engineers and hydrogeologists are often faced with the necessity of estimating the probable yield and drawdown of a well, with only drill cuttings or bailed samples available. A sketchy driller's log, the total depth of the test hole, and the static water level may also be furnished, but this type of information is insufficient to determine the specific capacity accurately. Sophisticated devices such as radioactive tracer isotopes and self potential-resistivity electric-loggers are now being utilized in groundwater hydrology. Experience, judgment, and common sense, however, are indispensable in dealing with most problems. The paper illustrates a hydrogeologist's approach to a typical problem. (Campbell-NWWA)
W71-10421

NEW TOOLS FOR NEW AND OLD WELLS,
Leggette, Brashears and Graham, New York.
J. B. Graham.
American Water Works Association Journal, Vol 58, No 10, p 1278-1284, Oct 1966.

Descriptors: *Water wells, *Wells, *Drilling, Rotary drilling, Logging (Recording).
Identifiers: Geophysical surveys, Electronic devices, Water tracers, Radioactive tracers, Specialty tools, Fracture systems, Air drilling, Well development.

The new tools and improved old tools that are now being used for the development of groundwater supplies will, no doubt, seem old-fashioned in another 10 years. Never before, in the United States at least, has there been such widespread concern as to the adequacy of our water supplies. Expanded research and development projects are being directed toward water resources almost on a crash program basis. Because technology in this field has been relatively slow in the past, the pace of progress will show great improvement. Many of the tools currently available to the groundwater hydrologist are not new in concept but most have undergone recent improvements or modifications that greatly increase their usefulness. Some of these are not all sophisticated or exciting. For example, an up-to-date, detailed, and reliable map showing the geology, topography, and at least some hydrologic features is the most important single tool that the groundwater investigator can have. Progress in field mapping in recent years has been outstanding. By means of aerial photography, coupled with improved capability in getting into difficult areas to make the necessary ground checks, high caliber maps can be provided in a relatively short time. Other tools are briefly examined. (Campbell-NWWA)
W71-10422

RESEARCH IS GUIDE FOR ESTIMATING WELL COSTS.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.

Johnson Drillers Journal, Vol 41, No 5, p 6-8. 5 fig.

Descriptors: *Water costs, *Groundwater, *Water wells, *Drilling, Water rates.
Identifiers: *Well costs, Pumping costs, Sand and gravel wells, Gravel-packed wells, Shallow sandstone, Limestone or dolomite wells, Deep sandstone wells.

No system for estimating costs ever provides 100 percent accuracy. However, historical data and analysis of the construction cost of many wells provides an excellent means of estimating future costs in any given geographical area. In Circular 98, published by the Illinois State Water Survey early in 1969, Messrs. J. P. Gibb and E.W. Sanderson presented graphs and other data which are of use in estimating costs of different types of wells. In this paper, entitled 'Cost of Municipal and Industrial Wells in Illinois, 1964-1966,' the authors summarize data on the initial cost of construction of 143 municipal and industrial wells during 1964, 1965 and 1966. The cost data was adjusted to a common 1966 level by increasing the 1964 and 1965 cost figures by 10 and 5 percent respectively. The information used by the authors in producing their work was from wells in Illinois. However, the use of the graphs need not necessarily be limited to Illinois. In those parts of the United States where geologic conditions are similar and where labor costs are comparable, these graphs are applicable. (Campbell-NWWA)
W71-10424

PIPE AND CASING IN WATER-WELL DRILLING.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.

Johnson Drillers Journal, Vol 42, No 1, p 1-6, Jul-Aug, 1970. 3 5ab, 7 fig, 6 ref.

Descriptors: *Well casings, *Construction materials, *Water wells, *Drilling, *Casing, Well regulations, Pipes, Oil industry.
Identifiers: Standard pipe, Line pipe, R and D Pipe, Drive pipe, Water well casing, Electric weld pipe, Specifications, A.P.I., Mill practices, Casing life, Wall thickness.

Every competent water well driller has practical knowledge about the pipe and casing he works with daily. There is, however, considerably more to be known about these products than would appear. This article studys this topic, since there are times when a more complete knowledge of these products may be helpful in getting better results, or avoiding trouble and confusion, or understanding bid specifications. The term 'casing' tends to be confusing for it carries a multitude of meaning. It is necessary to recognize what product is being used to case a well. There are five such products produced for the water well and plumbing industries, as distinguished from oil field products. They are: standard pipe, line pipe, reamed and drifted pipe, drive pipe and water well casing. Certain types of tubular products are considered to be oil country goods as distinguished from water well items. Due to differences which can cause both confusion and trouble, the separation of the two is desirable. The article explains in some detail these differences. (Campbell-NWWA)
W71-10425

CHECKING ALIGNMENT AND PLUMBNESS OF WELLS.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.

Johnson Driller's Journal, Vol 32, No 1, p 8-11, Jan-Feb 1960. 2 tab, 4 fig.

Descriptors: *Water wells, Drilling, Drilling equipment, Well regulations, Casing, Screens, Rotary drilling, Pumps.
Identifiers: *Well alignment, Plumbness, AWWA specifications, Pump installation, Cable tool drilling.

The conditions that cause wells to become crooked or out of plumb are: The character of the subsurface material penetrated while drilling, the trueness of the pipe used as a well casing, and the pull-down force on the drill pipe in rotary drilling. While drilling, gravity tends to make the drilling bit cut a vertical drill hole. Varying hardness of the materials being penetrated deflect the bit from a truly vertical course. The edge of a boulder in glacial drift, for example, will force either a cable-tool bit or a rotary bit to one side. In cable-tool drilling, the boulder may deflect the well casing as it is driven and cause the hole to drift increasingly as the well is deepened. Variations in the hardness of consolidated rock formations will also start a deflection. This often results in continued drift of the hole from the desired alignment. When drilling by the rotary method, too much force applied at the top of the drill stem will bend the slender column of drill pipe. This tends to start the bit cutting off center when any variation in hardness of the formation is encountered. Using heavy drill collars in the lower part of the drill stem to put plenty of weight just above the bit helps to overcome the tendency to drift. (Campbell-NWWA)
W71-10429

DISINFECTING WELLS AND WATER PIPING.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.

Johnson Drillers Journal, Vol 32, No 5, p 1-3, Sep-Oct 1960. 2 tab, 2 fig.

Descriptors: *Water wells, *Disinfection, *Drilling, Chlorination, Rotary drilling, Drilling equipment.
Identifiers: Sodium hypochlorite, Bleach.

A necessary final step in well completion is thorough disinfection of the well and its appurtenances to kill any bacteria that may be present. Materials and tools used in drilling and developing a water well are contaminated with dirt and some types of bacteria. Throughout the whole well construction operation some of these contaminating substances are introduced underground. The germs picked up on drilling tools, pipe and other materials are commonly those living in the topsoil at the well site. These are primarily harmless types that do not produce sickness. However, the type of germ used as an indicator of the possible presence of disease-producing bacteria may be among them. This germ, known as the coliform type bacteria, when present in water is taken as evidence that the water is polluted by either human or animal waste and that the water may contain disease producing organisms that normally live in the intestinal tracts of man and warm-blooded animals. The paper treats in detail the more simple disinfection methods in common use for water wells. (Campbell-NWWA)
W71-10431

MAINTENANCE OF WELL EFFICIENCY.
Wichita Water Department, Kans.
G. J. Stramel
American Water Works Association Journal, Vol 57, No 8, p 996-1010, August 1965. 9 fig, 11 ref.

Descriptors: *Water wells, Wells, Transmissibility, Specific capacity, Screens.
Identifiers: *Water well efficiency, Well redevelopment, Fine-sand movement, Jet cleaning, Pumpage rate.

One of the most difficult problems in the evaluation of efficiency of wells involves the proper interpretation and realistic applications of aquifer test results. Considerable field research is still needed in spite of the volumes of theoretic work that have been published. Walton provided an excellent paper on this subject. Stramel has suggested relatively simple field methods to provide approximate values of field coefficients of transmissibility and storage. Additional research is needed to evaluate the problem of velocity of flow at the aquifer-gravel pack face, a problem that has been almost totally ignored in well design. Information on this problem may prove to be a critical point in the evaluation of well losses. This article has just touched the problems associated with good well design. A successful program for maintenance of high production efficiency should include: (1) The application of all of the well design techniques described in the literature, (2) The consideration of entrance velocities, at both the face of the well screen and the bore hole-gravel pack face, (3) Well pumping at proper design rates, (4) The implementation of an aggressive program of well redevelopment. A new look at well construction techniques, improved well design, a better understanding of plugging or well loss phenomenon, and better methods of well development will result in high levels of efficiency and will prove to be far more profitable than accepting loss of efficiency as a fact of life. (Campbell-NWWA)
W71-10432

CHARTS SHOW AIR-LIFT PERFORMANCE.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.

Johnson Driller's Journal, Vol 34, No 3, p 3-4, May-June 1962. 1 tab, 2 fig.

Descriptors: *Water wells, *Pump testing, Pumps, Hydraulic systems, Wells, Performance.
Identifiers: Air line, Lift, Pumping pressure, Submergence.

The use of an air lift for developing and test pumping wells is often convenient and effective where conditions make it practicable. Many well drillers have air compressors for these purposes and make frequent use of them. In certain cases it is something of a problem to determine with reasonable accuracy whether the air-lift will be effective and what the requirements would be. Formulas for making these determinations are rather cumbersome, and the available tables are neither complete nor handy to use. Charts are presented which make it possible to determine quickly the general performance of an air-lift, under different operating conditions, and the air compressor requirements. (Campbell-NWWA)
W71-10434

8B. Hydraulics

OUTLET STRUCTURE FOR EAU GALLE RESERVOIR, EAU GALLE RIVER, WISCONSIN. HYDRAULIC MODEL INVESTIGATION.
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
Edwin S. Melsheimer.
Available from the National Technical Information Service as AD722 205, $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2-774, April 1967. 67p.

Descriptors: *Dams, *Model studies, *Outlet works, *Hydraulic systems, Flow, Spillways, Stilling basins.
Identifiers: *Hydraulic models, Wisconsin, Eau Galle River, Eau Galle Reservoir.

Model investigation of the outlet works for the Eau Galle Reservoir was concerned primarily with performance of the vertical-shaft intake structure under heads up to 80 ft. The study was conducted in a 1:20-scale model of the outlet works which reproduced a portion of the approach area, the intake structure, the outlet conduit, and the hydraulic-jump type stilling basin. Severe subatmospheric pressures which were detected in the original design morning glory intake and in the elbow below the intake were eliminated by providing a vertical-shaft spillway of increased cross-sectional area relative to the original morning glory spillway and a streamlined rectangular conduit intake in lieu of the original 90-deg elbow of circular cross section upstream of the 9.75-ft-high horseshoe-shaped outlet tunnel. Flow conditions in the conduit downstream of the adopted intake structure were satisfactory, and pressure conditions near the junction of the smaller low-flow conduit were positive with little or no fluctuation. Performance of the original stilling basin was acceptable; however, energy dissipation was improved by increasing the baffle pier height and repositioning the piers (type 3 basin). Observations indicated that the height of the basin training walls was sufficient to prevent overtopping.
W71-09998

NAVIGATION CONDITIONS AT MILLERS FERRY LOCK AND DAM, ALABAMA RIVER, ALABAMA. HYDRAULIC MODEL INVESTIGATION.
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
John J. Franco, and Louis J. Shows.
Available from the National Technical Information Service as AD722 211, $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2-775, April 1967, 60p.

Descriptors: *Dams, *Model studies, *River flow, *Locks, Spillways, Navigation, Hydraulic systems, Alabama.
Identifiers: *Hydraulic models, Alabama River, Millers Ferry Dam.

The Millers Ferry Lock and Dam project provides for a lock and dam at mile 142.2 on the Alabama River and a power plant in an earth dike about 3000 ft downstream of the main dam. The structures will consist of an overflow embankment on the right overbank, a 1012-ft-long gated spillway with 17 gate bays, an 84- by 600-ft lock left of the spillway, an earth dike extending downstream to the powerhouse intake section, and an earth dike extending normal to the river. The lock will have a maximum lift of 48 ft. Tests were conducted in a 1:160-scale, fixed bed model to determine the adequacy of the proposed design and to develop modifications to overcome or minimize adverse conditions. Results of the investigation indicated: (a) navigation conditions in the lock approaches would be extremely hazardous with the originally proposed design, (b) the shape of the gated sill would have to be modified to produce good stilling basin action and to eliminate large waves formed downstream, (c) satisfactory navigation conditions in the upper approach can be obtained by construction of a dike or spoil bank along the approach channel, a powerhouse approach channel on the overbank upstream of the end of the dike, a dike extending from the left bank to high ground upstream of the approach channel, and installation of ports in the upper guard wall, and (d) improvement of navigation conditions in the lower approach channel would require one or more of the following: (1) increase in maneuver area downstream of the lock, (2) reduction in the angle of the left bank toward the river channel, (3) fill on the left bank between the river and the powerhouse outlet channel, and (4) reduction in the length of bank between the river and powerhouse outlet channel downstream of the powerhouse.
W71-09999

EFFECTS OF HURRICANE BARRIER ON NAVIGATION CONDITIONS IN EAST PASSAGE, NARRAGANSETT BAY, RHODE ISLAND: HYDRAULIC MODEL INVESTIGATION.
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
J. G. Housley.

Available from the National Technical Information Service as AD721 985, $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2.754, Jan 1967, 111 p.

Descriptors: *Breakwaters, *Model studies, *Waves, *Hurricanes, Barriers, Ships, Navigation, Tropical cyclones, Tides, Test procedures, Rhode Island.
Identifiers: *Hydraulic models, Narragansett Bay, Ship models, Hurricane tide barrier, Aircraft carriers, USS Forrestal, CVA 59 vessel.

Tests were conducted on a 1:150-scale model of the East Passage of Narragansett Bay to determine the effects of wind, waves, and currents on the maneuverability of an aircraft carrier (a scale model of the U.S.S. Forrestal) passing through the navigation opening of an ungated hurricane-tide barrier in East Passage. Additional tests were conducted to determine wave and current patterns for various meteorological conditions and to secure velocity data in the vicinity of the barrier opening. Supplementary flume tests were also conducted to develop a design of the barrier opening that would satisfy the requirements of both flood control and navigation. The test results indicate that: An aircraft carrier could satisfactorily maneuver through the navigation opening in the ungated East Passage hurricane barrier during normal conditions and also in hydrometeorological conditions up to and including the 1938 hurricane. Velocities through the barrier opening during normal conditions would be higher than desired by small-craft operators and commercial shipping; however, sluice gates through the barrier would possibly reduce the velocities in the ungated navigation opening to an acceptable level. If a ship similar to that tested in this investigation should go to sea during the time of maximum flood current caused by a severe hurricane, it will pitch with considerable amplitude but will not strike the barrier sill unless the sill elevation is raised above -60 ft mlw.
W71-10000

MODERINIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY: HYDRAULIC MODEL INVESTIGATION,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
H. Ables Jackson, and Thomas E. Murphy.
Available from the National Technical Information Service as AD-722 209, $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2-778, May 1967 52p.

Descriptors: *Dams, *Model studies, *Locks, *Waterways, *Hydraulic systems, Feasibility studies, Filling, Drainage, Navigation, Ohio River.
Identifiers: *Hydraulic models, McAlpine Dam.

Tests were conducted on a 1:25-scale model of the filling and emptying systems of the existing 600- by 110-ft lock of the McAlpine project. These tests were concerned with whether structurally feasible modifications of the systems would result in decreased turbulence and hawser stresses and thus permit faster filling and emptying of the lock. Tests demonstrated that major improvement in performance of the filling and emptying system would result from connecting the filling and emptying culverts and plugging certain of the ports in the existing filling system.
W71-10001

CONTROL STRUCTURE, LITTLE SIOUX RIVER, IOWA, HYDRAULIC MODEL INVESTIGATION,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
Thomas E. Murphy.
Available from the NTIS as AD-722 210 $3.00 per copy, $0.95 in microfiche. WES Technical report 2-762, Feb 1967, 24 p.

Descriptors: *Inland waterways, *Model studies, *Construction materials, Flow, Riprap, Stilling basins, Feasibility studies.
Identifiers: *Hydraulic models, Iowa, Little Sioux River, *Drop structures.

The control structure in the Little Sioux River in Monona County, Iowa, was designed to provide nonscouring velocities upstream in the channel and on the channel berms between the levees. The structure consists of a rectangular drop in the central channel flanked by rock sills on the berms. Tests on a 1:30-scale hydraulic model were concerned with capacity of the structure, effectiveness of the concrete drop, and adequacy of the rock protection for the sills, channel, and berms. Model tests verified the adequacy of the concrete drop and the overall capacity of the structure. Modification of the riprap plan was required in certain areas to prevent failure and was recommended in other areas in the interest of economy.
W71-10002

MAGIC ISLAND COMPLEX, INCLUDING KEWALO BASIN AND ALA WAI BOAT HARBOR, HONOLULU, OAHU, HAWAII. HYDRAULIC MODEL INVESTIGATION,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
Charles W. Brasfeild, and Claude E. Chatham, Jr.
Available from the National Technical Information Service as AD-722 227. $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2-767, April 1967, 139 p.

Descriptors: *Islands, *Model studies, *Beaches, Ocean waves, Ocean currents, Tides, Water pollution.
Identifiers: *Hydraulic models, Hawaii, Harbor models, Ala Wai Harbor (Hawaii), Magic Island, Kewalo Basin.

Tests were conducted on a 1:100-scale model of an area along the beach at Honolulu, Hawaii, to investigate wave action and related phenomena pertinent to the proposed construction of a large artificial island for recreational and associated activities. The proposed island will be constructed between two existing facilities: Kewalo Basin, primarily a commercial fishing-boat harbor, and Ala Wai Boat Harbor, a pleasure craft harbor. These two harbors and sufficient offshore area to permit generation of the required test waves were included in the model. The study included an investigation of (a) currents and possible pollution in the proposed recreational areas and (b) remedial plans for the reduction of undesirable wave heights in the two existing harbors. Model equipment included wave-generating and wave-measuring apparatus, a water and simulated pollution inflow system, and apparatus for the simulation of a tidal cycle in the model. It was concluded that currents induced by prevailing waves would (a) prevent stagnation of the waters in the inner lagoon (the swimming area between the proposed island and the shore) by adequate circulation of fresh sea water through the area; (b) preclude the intrusion of significant quantities of pollutants into the inner lagoon from the Ala Wai Canal; and (c) effectively flush out the inner lagoon in a relatively short period of time in the event pollution did obtain therein. It was also concluded that wave action could be reduced to a satisfactory level in both Kewalo Basin and Ala Wai Boat Harbor by the installation of remedial plans tested in the model.
W71-10003

DROP STRUCTURE FOR GERING VALLEY PROJECT, SCOTTSBLUFF COUNTY, NEBRASKA: HYDRAULIC MODEL INVESTIGATION,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
Thomas E. Murphy.
Available from the National Technical Information Service as AD-722 226 $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2.760, Feb 1967, 30 p.

Descriptors: *Inland waterways, *Model studies, *Flow, *Erosion control, Drainage, Riprap, Stilling basins.
Identifiers: *Hydraulic models, Model tests, *Drop structure, Gering Valley project.

Tests were conducted on a 1:12-scale model of a rectangular drop structure designed to stabilize channel beds and minimize bank erosion in the Gering Valley drainage system. The majority of the tests were conducted on a 33-ft-wide structure with a drop height of 5 ft. Discharges up to a maximum of 6000 cfs were observed. Verification of generalized data was accomplished by tests on a structure with a 10-ft drop height. Of primary concern were development of the optimum dimensions for the various elements of the structure and determination of riprap requirements in the vicinity of the structure.
W71-10004

NAVIGATION CONDITIONS AT MCALPINE LOCKS AND DAM, OHIO RIVER. HYDRAULIC MODEL INVESTIGATION,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
John J. Franco, and Cody D. McKellar, Jr.
Available from the National Technical Information Service as AD-722 219. $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2-749, Nov 1966. 119 p.

Descriptors: *Dams, *Model studies, *River flow, Navigation, Locks, Ohio River.
Identifiers: *Hydraulic models, River currents, Flow fields, McAlpine Dam.

Model investigation of McAlpine Locks and Dam (formerly Locks and Dam No. 41) was concerned with the reconstruction and modernization of the existing locks and dam on the Ohio River at Louisville, Kentucky. The modernization plan included the construction of a new 110- by 1200-ft lock northwest of the existing 56- by 360-ft lock, modernization of an existing 110- by 600-ft lock, widening of the upper entrance canal, and reconstruction of the existing dam. An undistorted model, scale 1:120, reproducing approximately 6 miles of the Ohio River, the locks and dam, approach canal, hydroplant, and other structures that affect flow conditions, was used for the investigation. Test results indicated that satisfactory navigation conditions could be developed with several of the basic plans tested. Changes in composition of the dam in its existing location would have little effect on navigation conditions. Because of the set of the currents toward the dam, the development of satisfactory navigation conditions with a new canal across Shippingport Island would require the extensive use of ported training walls near and upstream of the lock entrance. The model indicated that by widening the approach canal, constructing a surge basin, and modifying the lock filling intake system, the surge resulting from lock filling could be controlled within practical limits. The swellhead at the dam with the maximum flood could be maintained with in about 0.5 ft of that with existing conditions by controlling the elevations of the spoil on and the floodway over Shippingport Island. Results of the study were used to develop detail modifications in the various elements of the selected plan and in the development of a rating curve of the dam.
W71-10005

NAVIGATION CONDITIONS AT COLUMBIA LOCK AND DAM, QUACHITA RIVER LOUISANA,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
John J. Franco, and Louis J. Shows.
Available from the National Technical Information Service as AD-722 220. $3.00 in paper copy, $0.95 in microfiche. WES Technical report, 2-756, Feb 1967 53 p.

Descriptors: *Dams, *Model studies, *River flow, *Locks, Navigation, Louisana, Flood control.
Identifiers: *Hydraulic models, River currents, Columbia Dam, Quachita River.

Columbia Lock and Dam, proposed for construction on the Quachita River, will provide a navigable pool extending upstream about 105 miles to the Felsenthal Lock and Dam (old Lock and Dam 6). The model investigation was concerned with the study of navigation conditions in the approaches to the lock and navigable pass to determine the adequacy of the proposed design and with the development of measures to overcome or minimize the effects of any adverse conditions. An undistorted model, scale 1:100 (model to prototype), reproducing approximately 2.6 miles of the Ouachita River and cutoff channel, including the lock and dam structures, was used for the investigation. The investigation indicated that the number of gate bays in the gated structure could be reduced from 5 to 4 resulting in a sizeable reduction in the required excavation through the cutoff channel. The navigable pass would have to be increased to at least 200 ft wide to provide satisfactory navigation conditions. The study also indicated that spoil could be placed along the adjacent overbank to improve navigation conditions in the approaches to the navigable pass and in the lower lock approach. The model demonstrated the effects of uneven gate operation and the feasibility of discharging, without special provisions, salt or other stratified solutions accumulating above the dam during low flows.
W71-10006

STABILITY OF PROPOSED BREAKWATER, BURNS WATERWAY HARBOR, INDIANA; HYDRAULIC MODEL INVESTIGATION,
U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.
Robert A. Jackson.
Available from the National Technical Information Service as AD-722 218. $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2-766, March 1967, 74 p.

Descriptors: *Breakwaters, *Construction materials, *Model studies, Harbors, Ocean waves, Stability, Indiana.
Identifiers: *Hydraulic models, Burns Waterway Harbor, Indiana.

Six series of tests were conducted on 1:35-scale models of the proposed rubble-mound breakwater. Five test series were conducted to develop stable designs for rubble-mound type breakwaters constructed of armor layers consisting of molded tribars (test series 1) or limestone blocks (test series 2-5). The sixth series of tests was concerned with determination of the experimental shape coefficient, voids, and thickness of a cover layer consisting of two layers of random-placed limestone blocks. The principal objectives of test series 1-5 were (a) to develop a stable design that would not be unusually difficult to construct, and at the same time would make optimum use of the different sizes of stone available from the quarry; and (b) to determine the heights of waves on the harborside of the breakwater resulting from the transmission of wave energy through and over the structure. A stable design using an armor layer consisting of two layers of random-placed limestone blocks was developed for the trunk section of the proposed rubble-mound breakwater based on a design-wave height of 13 ft. The test data for the better plans indicated that, for the selected prototype design wave, the height of the maximum transmitted wave would not be greater than about 3 ft. The average values of the thickness of two layers of 10- to 16-ton random-placed limestone blocks, and the corresponding shape coefficient and percent voids, were t — 11.6 ft, k delta — 1.0, and P — 41 percent, respectively.
W71-10007

SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN: HYDRAULIC MODEL INVESTIGATION,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
Yin Ben Dai, and Howard B. Wilson.
Available from the National Technical Information Service as AD-722 229. $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2-792, August 1967. 132 p.

Descriptors: *Breakwaters, *Model studies, *Harbors, *Waves, Storms, Michigan.
Identifiers: *Hydraulic models.

Six series of tests were conducted on 1:150-scale models of rubble-mound barrier trunk sections to obtain design criteria for rehabilitation of the existing barrier (test series 1-3) and construction of a new one west of the existing barrier (test series 4-6). Rehabilitation of the existing barrier would require an overtopping section similar to that tested in test series 3. The section would consist of adding to the harborside slope of the existing barrier quarrystone ranging in weight from about 20 lb to 2 tons. A cover layer of 20-ton armor units placed in a random fashion should be added to the seaside slope and the crown of the existing barrier and cover the quarrystone added to the harborside slope of the existing barrier. The barrier section would have a crown width of 22 ft, a crown elevation of ..20 ft mllw, a seaside slope of 1.6 on 1.0, and a harborside slope of 3.0 on 1.0. Construction of the new barrier west of the existing one would require a nonovertopping section which would have: (a) a freeboard of 3 ft or more; (b) a crown width of 22 ft or more; (c) a harborside slope not steeper than 2.0 on 1.0; (d) a core consisting of quarrystone ranging in size from 20 lb to 2 tons; (e) on the harborside slope, a cover layer of 4- to 10-ton armor stones from the crown elevation to about 20 ft below the crown elevation, followed by one layer of 10-ton armor stones to the bottom of the barrier section; and (f) adequate slope of the seadide of the barrier and adequate size of armor units, used as a cover layer on that slope, to withstand the attack of short-period waves.
W71-10008

SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN: HYDRAULIC MODEL INVESTIGATION,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
Yin Ben Dai, and Howard B. Wilson.
Available from the National Technical Information Service as AD-722 229, $3.00 in paper copy, $0.95 in microfiche. WES Technical report 2-761, Feb 1967, 78 p.

Descriptors: *Breakwaters, *Model studies, *Harbors, *Waves, Storms, Michigan.
Identifiers: *Hydraulic models, New Buffalo Harbor, Michigan.

The entire New Buffalo Harbor, located on the southeast shore of Lake Michigan, the proposed breakwater system, and sufficient adjacent shoreline and offshore bathymetry to permit accurate simulation of storm-wave action were reproduced in a 1:75-scale hydraulic model equipped with wave-generating and wave-height-measuring devices. The purpose of the model investigation was to determine the efficacy of the proposed breakwater system in providing a haven of refuge and protection for pleasure craft and fishing boats in the harbor during storm-wave action. It was concluded that the proposed breakwater system, consisting of a 1305-ft-long, dogleg-aligned north breakwater in combination with an 861-ft-long companion south breakwater that would form a 200-ft-wide navigation entrance leading into the mouth of Galien River, would provide the desired protection for the harbor and would, over a long term, be more economical than other less expensive (initial cost) plans that met wave-height criteria for plan acceptability.
W71-10009

OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
Missouri Univ., Rolla. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02E.
W71-10018

HYDRAULIC CALCULATION OF WATER DISCHARGE AND LEVELS IN RIVER DELTAS,
Arkticheskii i Antarkticheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
For primary bibliographic entry see Field 02E.
W71-10038

DESIGN LEVELS IN THE TRANSITION ZONE BETWEEN THE TIDAL REACH AND THE RIVER REGIME REACH,
Rijkswaterstraat, Voorburg (Netherlands).
J. W. van der Made.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 257-272, 1970. 16 p, 12 fig, 1 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Water level fluctuations, *Stage-discharge relations, *Design flood, *Frequency analysis, Tides, Tidal effects, Storms, Design storm, Flood forecasting, Streamflow forecasting, Equations, Deltas.
Identifiers: *Netherlands.

A method is given for assessing design levels in those river reaches where the water stages are being influenced by both the river runoff and the sea level. The design level depends on: the life time of the structure to be protected; the acceptable risk of flooding either by a storm surge at sea or by a flood wave on the river; the frequency curves of both sea level and river discharges; the dependency of the river stage at a given station in the transition zone on the sea level and on the river flow; and the possible correlation between sea level and river flow. The method was applied to the lower course of a river in the Netherlands. (Knapp-USGS)
W71-10039

A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
Institute of Hydrotechnical Research, Bucharest (Rumania).
A. Spataru, N. Calin, and G. Magearn.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 437-443, 1970. 7 p, 4 fig, 3 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Hydraulic models, *Saline water intrusion, *Deltas, *Channel improvement, *Sediment control, River training, Channel morphology, Sedimentary structures, Channels, Navigation, Model studies, Sand bars, Stratified flow, Saline water-freshwater interfaces.
Identifiers: *Danube Delta.

A model was used to study the effect which different construction schemes could have on the Danube flow at the Sulina mouth, on the salt water wedge, and on the bar position. The reasons for using models containing both fresh and salt water is discussed. At shallow depths the bed load has a tendency to be partially diverted out of the channel because of the shape of the contact surface between sea and river water. The narrowing of the river mouth moves the bar zone farther away into the open sea, but at the same time concentrates the bar closer to the channel axis. The effect of the change in direction of flow at the river mouth is reduced by the presence of the salt water, which acts like a barrier for the bottom currents. A general conclusion of the tests is that important improvements in channel maintenance cannot be ensured only by construction schemes at the mouth of the river. The narrowing of the mouth width displaces the site of the bar, but the same total volume of sediment is accumulated in front of the mouth. Opening a secondary mouth for the river, through which the bed-load would be flushed into the sea--aided by salt water wedge action--would improve channel maintenance. (Knapp-USGS)
W71-10056

CERTAIN ASPECTS OF THE INFLUENCE ON THE HYDROLOGIC REGIME OF HYDRAULIC WORKS FOR THE IMPROVEMENT OF NAVIGATION IN THE DANUBE DELTA (French: Certains apsects de l'influence sur le regime hydrologique des travaux hydrauliques effectues pour l'amelioration de la navigation dans le delta du Danube),
A. Simbotin, and V. Petrescu.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 467-472, 1970. 6 p, 5 fig, 10 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *River training, *Bed load, *Hydraulics, *Computer programs, Reviews, Streamflow, Regime, Channel morphology, Channel improvement.
Identifiers: *Danube Delta.

Results of two studies concerning the hydrological regime of the Danube Delta are presented. The first concerns changes in the hydrological regime which occur immediately after carrying out different kinds of improvement works on the Danube Delta navigable arms. The second study determines the bed-load regime of the Sulina channel, using the best known bed-load formulas. The computer programs used are briefly reviewed. (Knapp-USGS)
W71-10058

THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (French: L'influence des travaux d'amenagement sur la morphologie des bras du Delta du Danube),
Institute of Hydrotechnical Research, Bucharest (Rumania).
S. Diaconu, A. Spataru, and R. Negru.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 472-476, 1970. 5 p, 3 fig, 8 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Channel morphology, *Sediment transport, *River training, *Channel improvement, Hydraulics, Sediment load, Bed load.
Identifiers: Danube delta.

Development of navigation in the Danube Delta between Galatzi and Sulina requires an increase of the depth of the Danube. A method is developed for the determination of the reduced breadths required to realize the increase of the depth. Deformations of the river bed under the influence of the influence of the Ceatal Sf. Gheorghe hydraulic works influence the bed load transport; these channel changes are briefly outlined. (Knapp-USGS)
W71-10059

STUDIES OF THE DISPOSITION OF PARTIAL DISCHARGES OF BED LOAD UPSTREAM OF THE SULINA MOUTH (French: Etudes des dispositifs de dechargement partiel du debit solide en amont de l'embouchure de Sulina),
Gh. Dragota.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 477-482, 1970. 6 p, 6 fig, 2 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Sediment control, *Diversion structures, *Bed load, *River training, *Hydraulic models, Sediment transport, Channel improvement, Sediment discharge, Sediment load.
Identifiers: Danube Delta.

This paper presents the results obtained by tests run on a hydraulic model to determine the efficiency of a side canal to discharge bed-load upstream of the Sulina mouth of the Danube. Studies on some structures built in the branching zone with a view to direct the bottom currents and to increase intake of sediments by the diversion outlet canal are also presented. (Knapp-USGS)
W71-10060

RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
Arkticheskii i Antarkticheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
V. S. Antonov.
In: Hydrology of Deltas, Vol 2, Proceedings of the Bucharest Symposium, May 6-14, 1969: International Association of Scientific Hydrology-Unesco Co-edition, p 482-487, 1970. 6 p, 1 tab, 5 ref. (Also published in IASH Publication No 91, 1970).

Descriptors: *Model studies, *Hydraulic models, *Deltas, *Hydraulics, Channel improvement, River training, Sediment control, Navigation, Arctic, Cold regions, Regime, Stage-discharge relations.
Identifiers: *USSR, *Aerodynamic models.

The knowledge of spatial characteristics of the water regime in branched deltas in one of the most important and complex problems of hydrology. These characteristics may be determined by conventional hydraulic techniques providing that detailed field observations are available. The sparsity of these observations, however, and the very thin network of observational stations in the deltas of the Arctic rivers of the USSR makes the task of revealing these characteristics still more difficult. It is possible to overcome these difficulties with the help of aerodynamic model experiments based on the principal of aero-hydrodynamic analogs. Using scales of 1:2,500 to 1:20,000, the delta areas of such large Siberian rivers as the Ob, Lean Yenisey, Yana, and Kolyma have been studied for the last 12 years at the Arctic and Antarctic Research Institute, Leningrad. Laboratory studies of the water regime by means of aerodynamic models allows experimentation on the improvement of navigation at the bars of the deltas of the Arctic rivers. (Knapp-USGS)
W71-10061

MODEL STUDY OF POWER INTAKE GATE OF MOSSYROCK DAM,
Western Canada Hydraulic Labs. Ltd. (British Columbia).
For primary bibliographic entry see Field 08C.
W71-10168

SURFACE DISTURBANCE FROM SUBMERGED JET,
Asian Inst. of Tech., Bangkok (Thailand); and Bangkok Metropolitan Water Works Authority.
Norbert L. Ackerman, Rafael T. Apostol, and Suvit Siriyong.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY7, Paper 8236, p 937-948, July 1971. 12 p, 8 fig, 14 ref, append.

Descriptors: *Jets, *Dispersion, *Mixing, *Waves (Water), Hydraulics, Turbulent flow, Surface tension, Interfaces.
Identifiers: Submerged jets.

A submerged vertical jet of water impinging on a free surface produces a distrubance at the still water level. The disturbance height and other characteristics of the surface profile depend upon the momentum of the jet, the diameter and depth of submergence of the nozzle from which the jet originates, and the physical properties of the fluids which are contiguous at the interface. Equations are presented which enable the height and appearance of the disturbance to be predicted. (Knapp-USGS)
W71-10171

FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
Southampton Univ. (England). Dept. of Civil Engineering.
Mahmoud Faisal Rifai, and Kenneth V. H. Smith.
ASCE Proceedings, Journal of Hydraulics Division, Vol 97, No HY 7, Paper 8246, p 963-976, July 1971. 14 p, 10 fig, 13 ref, append.

Descriptors: *Alluvial channels, *Dunes, *Ripple marks, *Turbulent flow, *Open channel flow, Sedimentary structures, Channel morphology, Hydraulic models, Model studies, Turbulence, Vortices, Eddies, Sand waves.
Identifiers: Von Karman number.

A series of rigid triangular elements, placed on the bed of a laboratory flume, were used to simulate alluvial channel bed features which are large relative to the depth of flow. The frequency of the turbulence throughout the flow is higher than that for comparable flow over a rigid plane bed, due to the higher frequency turbulence arising from the eddies in the lee of the elements. The macroscale of turbulence is approximately equal to the height of a triangular element, whereas in plane bed flow the macroscale is approximately equal to the depth of flow. Large variations in the average value of the Von Karman constant occurred for different positions along the length of a triangular element, and these are shown to be comparable with variations observed in dune-bed alluvial channel flow. (Knapp-USGS)
W71-10173

FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
Georgia Inst. of Tech., Atlanta. Dept. of Civil Engineering.
C. Samuel Martin, and Jerome J. Zovne.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY 7, Paper 8234, p 993-1010, July 1971. 18 p, 14 fig, 3 tab, 12 ref, append.

Descriptors: *Simulation analysis, *Bores, *Waves (Water), *Computer programs, *Mathematical models, Numerical analysis, Unsteady flow, Dam failure, Open channel flow., Surges.
Identifiers: *Finite difference method.

A finite-difference method is applied to the gradually varied flow equations of open-channel flow for the purpose of simulating the gross aspects of bore propagation. In contrast to other treatments relating to bore inception and propagation the conservation equations of momentum and continuity across the bore are relaxed. The problems of dam break and the reflection of a bore from a dead end are solved and compared with the more exact solution based on the method of characteristics (Stoker's solution). For both problems the results of the staggered-net finite-difference solution compare quite favorably with Stoker's solution as long as the flow is subcritical. Although no sharp-fronted bore forms, the surge represented by the gradually varied flow solution has the same maximum velocity and depth as the bore. The maximum depth and velocity behind the surge propagate at nearly the same velocity as the bore. The finite-difference solution provides an adequate simulation of such gross quantities of bore propagation as momentum and depth and velocity of flow. (Knapp-USGS)
W71-10174

PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
Connecticut Univ., Storrs. Dept. of Civil Engineering; and Rocky Mountain Hydraulic Lab., Allensport, Colo.
For primary bibliographic entry see Field 08A.
W71-10175

DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
Canterbury Univ., Christchurch (New Zealand). Dept. of Civil Engineering; and Lincoln Coll., Canterbury (New Zealand). Dept. of Agricultural Engineering.
Alex J. Sutherland, and David J. Painter.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, HY 7, Paper 8233, p 1031-1044, July 1971. 14 p, 1 fig, 5 tab, 12 ref, append.

Descriptors: *Turbulent flow, *Unsteady flow, *Dimensional analysis, *Turbulence, *Flow resistance, Reynolds number, Roughness (Hydraulic), Fluid friction, Non-uniform flow, Pressure drag, Shear drag, Density, Viscosity.
Identifiers: Drag (Hydraulics).

Drag coefficients for spheres in nonsteady turbulent flow are found to be functions of the acceleration number, and either the particle Reynolds number of the relative turbulence intensity or both. Dependence on all three parameters is the most likely alternative. Expressions for the force on a sphere in nonsteady turbulent flow are formulated by dimensional analysis. It is suggested that the drag coefficient depends upon: (1) Particle Reynolds number; (2) relative turbulence intensity; (3) turbulence scale to particle diameter ratio; and (4) the particle to fluid density ratio. Drag coefficients derived from a study of particle motion in water passing through a diffuser are analyzed statistically to determine their dependence upon the suggested parameters. A similar analysis of results obtained by other investigators, who fired solid particles into a steady air stream, shows that the drag coefficient depends upon the same dimensionless ratios in the same way. (Knapp-USGS)
W71-10177

JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
Virginia Military Inst., Lexington. Dept. of Civil Engineering; and Wisconsin Univ., Madison. Dept. of Civil Engineering.
Donald K. Jamison, and James R. Villemonte.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY 7, Paper 8258, p 1045-1063, July 1971. 19 p, 9 fig, 1 tab, 15 ref, append.

Descriptors: *Pipe flow, *Laminar flow, *Transition flow, *Flow resistance, *Joints (Connections), Head loss, Water distribution (Applied), Closed conduit flow, Metal pipes, Laboratory tests.
Identifiers: *Pipe junctions, Tees (Pipes).

Analytical and experimental studies were carried out to develop additional data on energy losses at a junction for systems operating in the Reynolds number range of between 10 and 10,000. The test pipe fittings were short radius, galvanized screwed tees operated as as to produce both a combination and division of flow. The fittings were mounted in a 3/4-inch standard black iron pipeline with SAE No. 10 cylinder oil being circulated by a gear pump driven by a variable speed motor. The analytical phase of the program yielded fitting-loss coefficients which can be used to estimate the energy loss due to the fitting over and above that due to straight pipe friction. It was concluded from an analysis of the results that the relationship between the loss coefficients and Reynolds number for pipe fittings can be represented by a family of curves similar in format to those of the Moody diagram for flow in straight pipes without fittings. (Knapp-USGS)
W71-10178

DESIGNS FOR RUBBLE -MOUND BREAKWATERS, DANA POINT HARBOR, CALIFORNIA,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
Yin-ben Dai, and Robert A. Jackson.
Available from the National Technical Information Service as AD-720 189, $3.00 in paper copy, $0.95 in microfiche. WES Technical Report 2-725, Jun 1966. 49 p.

Descriptors: *Breakwaters, *Hydraulic models, *Model studies, Oceanwaves, Harbors, Construction materials, Test procedures, California.
Identifiers: Dana Point Harbor, California.

Tests were conducted on 1:50- and 1:100-scale models of rubble-mound breakwater sections constructed of quarrystone to obtain data for design of a stable rubble-mound breakwater which will allow a minimum of wave energy to pass through and over the structure into the protected area of the marina, to obtain design data for wave absorbers on the fairway side of the interior mole, and to determine the relation between wave transmission in a 1:50-scale model and in a 1:100-scale model. The initial breakwater plan developed by the Los Angeles District (LAD) was not adequate to withstand 12- and 18-sec waves 16 ft high when the cover stones were random-placed. Stability was improved slightly when the stone was placed in accordance with a special technique suggested by LAD, and a modification of the original design was developed by LAD which was stable for the largest breaking waves which could reach the structure. A mole-revetment and breakwater combination that satisfied the selected wave-height criterion was developed. Transmitted wave heights on the harborside of the 1:50-scale model were greater than those on the 1:100-scale model. Therefore, 1:100 breakwater sections that would reproduce the wave-transmission characteristics of the 1:50 breakwaters were developed for use in three-dimensional model tests.
W71-10199

STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
National Aeronautic and Space Administration, Hampton, Va. Langley Research Center; and Purdue Univ., Lafayette, Ind. School of Aeronautic, Astronautic and Engineering Sciences.
Jay C. Hardin, and Arnold L. Sweet.
Sponsored in part by National Science Foundation.
ASCE Proceedings, Journal of the Engineering Mechanics Division, Vol 97, No EM2, Paper 8056, p 375-389, April 1971. 15 p, 8 fig, 2 tab, 16 ref, append.

Descriptors: *Statistical models, *Stochastic processes, *Turbulent boundary layers, *Turbulent flow, *Open channel flow, Turbulence, Boundary processes, Vortices, Eddies, Velocity, Boundary layers.
Identifiers: *Stochastic models, Navier-Stokes equation.

A stochastic model of incompressible turbulent channel flow is based solely upon knowledge of the mean velocity profile and energy considerations derived from the Navier-Stokes' equations, yet provides a description of the entire turbulent field. Turbulence is presumed to occur as highly structured elements of fluid, or eddies. These eddies are initiated along the walls as a Poisson process and diffuse outward into the flow. The diffusion of eddies is described by a Wiener process in the high shear regions near the walls and an Ornstein-Uhlenbeck process in the center region. A mathematical form for the eddies is postulated which is a random function of the entire past history of the eddy in relation to the mean shear. The eddies grow and then decay as the flow progresses. From such information, a stochastic description of the velocity at any point in the flow is obtained. All spatial correlations of the velocity field may thus be determined through an analysis in which Eulerian statistics are derived from Lagrangian densities. Second moments are computed and compared with available experimental data. (Knapp-USGS)
W71-10317

CAVITATION PARAMETERS FOR OUTLET VALVES,
Metropolitan Water District of Southern California, Los Angeles.
W. P. Winn, and D. E. Johnson.
Proceedings American Society of Civil Engineers, Journal of the Hydraulics Division, Vol 96, No HY12, p 2519-2533, Dec, 1970. 15 p, 14 fig, 7 ref, 2 append.

Descriptors: *Hydraulic valves, *Cavitation, Cavitation control, Test facilities, Hydraulics, Flow characteristics, Cavitation noise, Valves, Tests, *Water distribution (Applied), Sleeve valves, Cost savings, Test procedures, Instrumentation, Plug valves, Cavitation index, Throttling, Needle valves, Vibration.
Identifiers: Valve vibration, Cavitation parameters.

Testing regulating valves to determine flow and cavitation characteristics in order to make a practical and economic selection of valves for use in hydraulics control is described. The change in cavitation characteristics with a change in upstream head must be considered. Care should be exercised in using butterfly valves, vanes, or struts downstream of throttling valves because of the helical flow pattern caused by the throttling action. The vertical sleeve valve eliminates noise, vibration, and spray, resulting in use in populated areas without difficulty. Savings from the development of valve details have lowered valve costs. Additional savings are anticipated from the development of the vertical sleeve valve. (USBR)
W71-10379

TRANSIENTS IN PIPELINES CARRYING LIQUIDS OR GASES,
Michigan Univ., Ann Arbor.
V. L. Streeter.
Proceedings, American Society of Civil Engineers, Transportation Engineering Journal, Vol 97, No TE1, p 15-29, Feb 1971. 15 p, 7 fig, 6 ref, 2 append.

Descriptors: *Fluid flow, Natural gas, Petroleum, Hydraulics, Computer applications, *Pipe flow, *Pipelines, Unsteady flow, Compressors, Pumps, *Water hammer, Fluid mechanics, Friction, Equations, Computer programs, *Transients, Pressure, Mathematical models.
Identifiers: Pipeline surges, *Method of characteristics, Pressure waves.

Unifying equations are developed for unsteady flow of natural gas, water, or petroleum products through long pipelines. Second-order accuracy terms for fluid friction are used with exponential equations in common use. The equations are solved by either the method of characteristics or the centered implicit method. Results of computer studies indicate stability and accuracy of the implicit method, although more computer time is required than for the characteristic method. (USBR)
W71-10395

POWER LOSSES AND FLOW TOPOLOGIES IN CONVERGING MANIFOLD,
California Univ., Davis. Dept. of Water Resources.
J. Amorocho, and J. J. DeVries.
Proceedings, American Society of Civil Engineers, Journal of the Hydraulics Division, Vol 97, No HY1, p 81-99, Jan 1971. 19 p, 10 fig, 4 tab, 9 ref, 2 append.

Descriptors: Coefficients, Energy losses, Flow, *Hydraulic models, *Hydraulics, *Manifolds, Pumping, Head losses, Discharge lines, *Tests, Pumping plants, Experimental data, Junctions, Velocity, Test results, Pressure, Reynolds number, Energy transfer.
Identifiers: Topology, Experimentation, Experimental models.

Power losses and loss coefficients were determined from a hydraulic model study for a pumping plant discharge manifold which receives flow from 7 equal-discharge pump units. A topologic index is used to characterize the combinations of pumps in operation and to represent trends in energy and power losses. For a given total plant discharge, certain combinations of pump units in operation give lower power losses than other combinations. The topologic indices associated with these pump combinations are used to define optimal or near optimal pumping plant operations. The topologic index simplifies testing programs for multiple branch manifolds because a few trials can be used to define the trend of the power transfer coefficient. (USBR)
W71-10397

8C. Hydraulic Machinery

MODEL STUDY OF POWER INTAKE GATE OF MOSSYROCK DAM,
Western Canada Hydraulic Labs. Ltd. (British Columbia).
Robert A. Robertson, and James W. Ball.
ASCE Proceedings, Journal of the Hydraulics Division, Vol 97, No HY7, Paper 8229, p 889-906, July 1971. 18 p, 16 fig, 1 ref.

Descriptors: *Hydraulic models, *Intakes, *Inttake gates, Damage, Hydraulics, Fluid mechanics, Dams, Nozzles, Orifices, Penstocks.
Identifiers: *Tacoma (Wash), *Mossyrock Dam (Wash).

One of the penstock service gates at Mossyrock Dam, at Tacoma, Wash., catapulted high in the gate shaft, rebounded, and inflicted severe damage to itself, its embedded steel beam sill, and its operating mechanism when it was used at a small opening to fill the penstock. Tests on a 1:26 scale model of the gate and penstock to ascertain how each of five separate forces contributed to the catapulting action and to develop corrective measures are analyzed. The model tests showed that the gate was catapulted up the shaft, perhaps as much as 50 ft. and that major alterations to the gate shaft base, not feasible for the Mossyrock installation, would be required to ensure against the action. Conditions that caused the model gate in early stages of the test program to stop at small openings while descending at slow speeds during simulated emergency closures are examined. Measures taken to assure model-prototype similarity and comparisons of model and prototype test data are described. (Knapp-USGS)
W71-10168

PROBLEMS WITH LARGE UNDERGROUND STATIONS IN ITALY,
Ente Nazionale per l'Energia Elettrica, Rome (Italy).
M. Dolcetta.
Paper, American Society of Civil Engineers National Water Resources Engineering Meeting, Phoenix, Arizona, Jan 1971. 44 p, 18 fig, 7 tab, 30 ref.

Descriptors: *Underground powerplants, Underground structures, Design, Rock properties, Underground openings, Subsurface investigations, Pumped storage, Rock tests, *Rock mechanics, Finite element method, Stability, Displacements, Laboratory tests, Pumping plants, Bibliographies, In situ tests, Field tests, Foreign design practices, Construction.
Identifiers: Italy.

Four large underground pumping-generating stations are under construction in the Alpine range in Italy. The high heads involved require generator-turbine-pump sets with shafts to more than 40 m long. The required size of the underground rooms presents rock mechanics problems that are more complicated than any encountered in the past. To illustrate how these problems have been solved in Italy, criteria followed in exploration, preliminary studies for design and construction, and check of the results for one of the stations (Lake Delio) are presented. The Lake Delio underground chamber is 20 m wide, 196 m long, 61 m high, and will house 8 triplex units having a total capacity of 1000 mw. The station will operate under a head of 750 m. Field and laboratory tests to determine the physical-mechanical properties of the rock, and measurements made during and after construction to check results of rock mechanics analyses are discussed. A study of a complex geomechanical model to determine stability of the chamber, and finite element analyses to determine displacements are described. Calculated displacements are compared to measured displacements. (USBR)
W71-10402

AGING OF OIL-FILLED CABLE DIELECTRICS,
Fujikura Cable Works Ltd., Tokyo (Japan).
S. Kagaya, T. Yamamoto, and A. Inohana.
Institute of Electrical and Electronics Engineers, Transactions Power Application Systems, Vol PAS-89, No 7, p 1420-1428, Sept-Oct 1970. 9 p, 11 fig, 12 tab, 9 ref, 3 disc.

Descriptors: *Dielectric properties, Dielectrics, *Electric cables, Extra high voltage, *Insulating oil, Deterioration, Laboratory tests, Aging (Physical), Power factor, Foreign research, Temperature, *Oil-filled cables.
Identifiers: Dielectric breakdown, Japan.

The dielectric power factor is important in EHV cable dielectrics, and is the most suitable measure for evaluating the aging stability of EHV oil-filled cable dielectrics. A description of aging stability for self-contained, oil-filled cable dielectrics is given. The power factor of oil-filled cable dielectrics over an extended period and the dielectric properties of low-pressure, self-contained, oil-filled cable withdrawn from service were studied. Results suggest that the increase in the power factor of oil-filled cable after long use is attributed mostly to deterioration of mineral insulating oil. No appreciable change was noted in the insulating paper used in the cable. (USBR)
W71-10404

ESTIMATE OF FORCES EXERTED AGAINST SPACERS WHEN FAULTY CONDITION OCCURS,
Hitachi Cable Ltd., Tokyo (Japan).
H. Hoshino.
Institute of Electrical and Electronics Engineers, Transactions Power Application Systems, Vol PAS-89, No 7, p 1475-1484, Sept-Oct 1970. 10 p, 13 fig, 2 tab, 5 ref, disc.

Descriptors: *Bundled conductors, Transmission lines, *Electrical faults, Galloping conductors, *External forces, Elasticity (Mechanical), Calculations, Experimental data, *Spacers, Electric conductors, Foreign research, Spacing, Tension, Weight.
Identifiers: Transmission line hardware, Japan.

Certain problems exist concerning spacers in bundle transmission lines. The issues involve forces caused by fault current, hybrid fluttering (galloping) of the bundle, and vibration; other problems such as wear, fatigue, and relaxation of the materials over a period of time also arise because of these forces. Existing literature on forces exerted during a fault event is concerned only with specific conditions; predicting the force applied for an entirely different condition is difficult. The summarized analysis was developed by common basic calculations. A tabulation compares calculated values of forces on spacers with measured values. (USBR)
W71-10409

8D. Soil Mechanics

THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
Imperial Coll. of Science and Technology, London (England). Dept. of Civil Engineering.
Peter Michael James.
Quarterly Journal of Engineering Geology, Vol 3, No 1, p 41-53, December 1970. 13 p, 6 fig, 1 tab, 6 ref.

Descriptors: *Soil mechanics, *Tropical regions, *Soil compaction, *Soil engineering, *Foundation investigations, Soil properties, Permeability, Soil investigations, Alluvium, Sediments, Canals, Clays, Silts.
Identifiers: *Malaya.

The behavior under load of a thick deposit of normally consolidated recent sediments in northwest Malaya was studied by means of full-scale trial embankments. Two parallel embankments of 9 ft and 11 ft in height, with slopes averaging one vertical to two horizontal and lengths of about 200 ft were constructed. The in-situ three-dimensional permeability of the stratum was some two to three orders of magnitude higher than the vertical permeability computed from laboratory tests. Consolidation settlements beneath the embankments were therefore extremely rapid and largely completed within two or three months of the end of construction, in contrast to periods of years predictable from oedometer tests. There appeared to be a reduction in the permeability of the soft foundation soils undergoing settlement as well as an increase in strength of the soils, the latter occurring largely during the early consolidation stages. The major part of the settlement is believed to be provided by secondary consolidation of the soft soils. Normal consolidation theory of settlement predictions is shown to be applicable only for loads below a threshold level. The normally consolidated sediments showed several characteristics typical of overconsolidation. (Knapp-USGS)
W71-10032

LABORATORY EVALUATIONS OF CANAL SOIL SEALANTS. AN OPEN AND CLOSED CONDUIT SYSTEMS INVESTIGATION OF FOUR PROPRIETARY MATERIALS PROPOSED AS CANAL SOIL SEALANTS ON SILTY SAND IN LABORATORY PERMEAMETERS,
Bureau of Reclamation, Denver, Colo. Engineering and Research Center.
C. W. Jones.
Available from the National Technical Information Service as PB-197 911, $3.00 in paper copy, $0.95 in microfiche. Bureau of Reclamation report REC-ERC-70-1, Jan 1971. 18 p, 12 fig, 4 tab, 1 ref.

Descriptors: *Permeability, *Soil sealants, *Canal linings, Water seals, Laboratory tests, Sands, Pervious soils, Water seals, Gels.
Identifiers: *Canal sealants, Chemical sealants, *Permeability tests, Open and Closed Conduit System Prog, Seepage control.

Four proprietary materials proposed for canal sealants were evaluated in the Bureau of Reclamation laboratory. Tests on silty sand specimens of 12-in. (30.5-cm) length were conducted in 1-in. (2.5-cm)-dia plastic permeameter tubes. Permeability rates of the soil specimens were determined before and at time intervals after treatment. Treatments at rates from 50 to 800 lb/acre (56 to 896 kg/ha) were generally accomplished by mixing the sealants with water and ponding them over the soil specimen surfaces. Increments of the soil were removed from a specimen top until the permeability rose to the original pretreatment rate. The total depth of soil removed was considered to be the effective depth of penetration for the sealant. One sealant, applied at the rate of 100 lb/acre (112 kg/ha), significantly reduced soil permeability and penetrated the soil at least 2 in. (5.1 cm). This sealant is recommended for further testing in other soil conditions. Another sealant reduced permeability but did not pentrate the soil. The remaining 2 sealants did not significantly reduce the permeability rate. In several tests, sealants that swell into soft gels when wetted were spread on the soil surfaces. The gels did not seal the soil as well as sealants applied mixed with water.
W71-10201

THE SELETAR SCHEME, SINGAPORE,
Binnie and Partners (Malaysia).
For primary bibliographic entry see Field 03B.
W71-10382

PHREATIC SURFACE LOCATION AFTER DRAWDOWN,
Army Corps of Engineers, Vicksburg, Miss; and Purdue Univ., Lafayette, Ind.
A. H. Dvinoff, and M. E. Harr.
Proceedings, American Society of Civil Engineers Journal of the Soil Mechanics and Foundation

Division, Vol 97, No SM1, p 47-58, Jan 1971. 12 p, 13 fig, 10 ref, 2 append.

Descriptors: Drainage, *Drawdown, Embankments, Earth dams, *Phreatic lines, Seepage, Slope stability, Soil mechanics, Unsteady flow, *Rapid drawdown, Boundary conditions, Zoned embankments, *Finite difference method.
Identifiers: Hele-Shaw Model.

To determine the stability of an earth embankment following rapid drawdown, the phreatic surface must be located. Using a finite difference technique, the partial differential equation governing unsteady flow in porous media has been solved for various conditions. Curves and equations are presented for locating the phreatic surface in the previous shell of an embankment having a vertical impervious core and resting on an impervious foundation. The embankment may be constructed with any slope angle. The phreatic surface can be located following instantaneous drawdown, or during and after drawdown at a constant rate. To assure validity of the analysis, calculations using these curves and equations are compared with the results of viscous flow-model studies. (USBR)
W71-10390

LIMIT ANALYSIS OF STABILITY OF SLOPES,
Lehigh Univ., Bethlehem, Pa.
W. F. Chen, and M. W. Giger.
Proceedings, American Society of Civil Engineers, Journal of the Soil Mechanics and Foundations Division, Vol 97, No SM1, p 19-26, Jan, 1971. 8 p, 3 fig, 3 tab, 3 ref, 2 append.

Descriptors: Soil mechanics, Energy dissipation, Limit design, Earth dams, *Slopes, Plasticity, *Slope stability, *Stability analysis, Failure surfaces, Equilibrium, Embankments, Safety factors, Slip-circle method.
Identifiers: *Limit analysis, Friction circle method.

The upper bound theorem of limit analysis was applied to obtain complete numerical solutions for the critical height of slopes. A logarithmic spiral mechanism where the failure surface may pass below the toe was assumed. The analysis included existing limit equilibrium solutions and previously obtained limit analysis solutions so that it could be considered a generalization of all previous solutions. Results were practically identical to those obtained by existing limit equilibrium procedures. The upper bound method may be much more convenient to use in many cases, and places the matter of stability analysis on a much more logical ground. (USBR)
W71-10393

FIELD SOLUTIONS FOR TURBULENT SEEPAGE FLOW,
Monash Univ., Clayton (Australia).
A. K. Parkin.
Proceedings American Society of Civil Engineers Journal of the Soil Mechanics and Foundations Division, Vol 97, No SM1, p 209-218, Jan 1971. 10 p, 5 fig, 29 ref, 2 append.

Descriptors: *Finite element method, *Rockfill dams, Groundwater, Free surfaces, Porous media, *Seepage, *Slope stability, Soil mechanics, Flow nets, Turbulent flow, Nonlinear systems, Laminar flow, Overtopping, Pore pressure, Stability analysis, Phreatic lines, Bibliographies, Porous media flow, Fluid flow.
Identifiers: Nonlinear properties, Streamlines.

A finite element method is presented for analyzing nonlinear flow in porous media. Such problems are frequently of the free surface type, and are associated with rockfill dams, flood diversion, and some natural slopes. Because of the changing geometry of the elements, the nonlinear flow net cannot be obtained readily by sketching methods, but computational procedures can be used instead, obtaining streamlines and equipotentials separately. Comparisons are drawn between laminar and turbulent states; the latter produces higher pore pressure. Stability analyses on overtopped rockfilled banks indicate that the unstable zone is a parallelogram adjoining the downstream face having a depth of two-thirds the height of the bank for all profiles. A reasonable indication is given of the volume of material requiring mesh protection for overtopping. (USBR)
W71-10394

A THEORY FOR THE SHEAR STRENGTH OF ROCKFILL,
Hydro-Electric Commission, Tasmania.
J. K. Wilkins.
Rock Mechanics, Vol 2, No 4, p 205-222, Dec 1970. 18 p, 8 fig, 1 tab, 10 ref, 2 append, disc.

Descriptors: *Rock fills, *Shear strength, Friction, *Void ratio, Friction coefficient (Mechanical), Sliding, *Sliding resistance, Rock breakage, Stress, Rock mechanics, Statistical analysis, Triaxial tests, *Rockfill dams, Rock slope stability, Slope stability, Shear, Foreign research.
Identifiers: Tasmania, Australia.

Shear strength of rockfill is controlled by the basic angle of friction of rock on rock, the void ratio, and the particle breakage, and is dependent on the ratio of major to minor principal stresses. Statistical methods combined with some simple assumptions based on experimental work were used to derive formulas for the shear strength of rockfill. Theoretical results were compared with results of laboratory triaxial tests. A supporting fabric of stable particles within a rockfill mass must exceed one-half the total volume to avoid failure. The proportion of unstable particles is determined by the principal stress ratio and can be calculated by statistical methods. The proportion of broken particles is linked with the initial void ratio and the maximum principle stress. The proportion of breakage does not increase indefinitely with stress, but reaches a limit depending on the initial void ratio. Broken particles can be considered as part of the voids and added to particles rendered unstable by the increasing principal stress ratio in computing failure stresses.
W71-10403

TECHNIQUE FOR STUDY OF GRANDULAR MATERIALS,
Ecole Polytechnique, Montreal (Quebec).
S. J. Windisch, and M. Soulie.
Proceedings, American Society of Civil Engineers, Journal of the Soil Mechanics and Foundations Division, Vol 96, No SM4, p 1113-1126, July 1970. 14 p, 12 fig, 7 ref, 2 append.

Descriptors: *Epoxy resins, Grain sizes, Materials tests, *Sands, Soil stabilization, *Granular materials, Grouting, *Cohesionless soils, *Soil mechanics.
Identifiers: *Thin sections, AM-9 chemical grout.

A technique is proposed for measuring characteristics related to the grain-pore distribution of granular deposits without disturbing the original granular structure. The technique consists of successive phases of impregnation with 2 different types of grout, resulting in fixing the original grain configuration in a hard epoxy matrix. Thin sections are readily obtained, allowing determination of the required characteristics along any given line or plane within the porous deposit. The successive steps of the experimental technique are described and accompanied by illustrations and sample calculations. The technique is expected to have a wide range of applications in research related to the study of granular materials. (USBR)
W71-10405

DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
Stanford Univ., Calif.
J. I. Folayan, K. Hoeg, and J. R. Benjamin.
Proceedings, American Society of Civil Engineers, Journal of the Soil Mechanics and Foundations Division, Vol 96, No SM4, p 1127-1141, July 1970. 15 p, 8 fig, 1 tab, 14 ref, 3 append.

Descriptors: Probability theory, Reliability, *Soil mechanics, Levees, *Settlement (Structural), *Statistical analysis, *Subsidence, Marshes, *Safety factors.
Identifiers: *Decision theory.

Application of theory of probability permits a rational approach to an evaluation of the meaning of safety factors as used in soil mechanics. The Bayesian approach shows how the reliability of an engineering analysis depends on the amount and nature of the engineer's previous experience with similar problems. Statistical decision theory is applied to determine a course of action logically consistent with the decision-maker's preferences. A case study is examined involving settlements of reclaimed marshland and associated economic considerations. The reliability of settlement predictions for San Francisco Bay mud falling within 20% of the actual is of the order of 0.7. For the given set of circumstances, the optimal sample size varied between zero and 15, depending on the engineer's previous experience. Probabilistic procedures provide a framework that can assist the engineer to organize, accumulate, interpret, and evaluate experience. (USBR)
W71-10406

CAPACITANCE TECHNIQUES FOR RADIAL DEFORMATIONS,
Purdue Univ., Lafayette, Ind; and Baghdad Univ. (Iraq).
A. G. Altschaeffl, and L. P. Mishu.
Proceedings, American Society of Civil Engineers, Journal of the Soil Mechanics Foundations Division, Vol 96, No SM4, p 1487-1491, July 1970. 5 p, 4 fig, 5 ref, append.

Descriptors: Soil mechanics, *Soil tests, *Triaxial tests, Capacitors, Deformation, Capacitance, Electric bridges, Servomechanisms, Soils.

A sensitive device for measuring radial deformations in the triaxial test is described. The device measures the change in capacitance associated with a changing gap around the specimen and does not require contact with the soil sample. The high potential accuracy of capacitance devices and the absence of a need to touch the specimen in measurement suggest the usefulness of such apparatus. Appreciable calibration and shielding of stray interferences are needed. Attaching servomechanisms to perform zero-lateral-strain-triaxial tests appears possible. (USBR)
W71-10407

8E. Rock Mechanics and Geology

A THEORY FOR THE SHEAR STRENGTH OF ROCKFILL,
Hydro-Electric Commission, Tasmania.
For primary bibliographic entry see Field 08D.
W71-10403

THE MEASUREMENT OF ROCK STRESS CHANGES USING HYDRAULIC BOREHOLE GAGES,
Terrametrics, Inc., Golden, Colo.
J. B. Sellers.
International Journal of Rock Mechanics and Mining Sciences, Vol 7, No 4, p 423-435, July 1970. 13 p, 3 fig, 5 tab, 10 ref, append.

Descriptors: *Rock mechanics, *Stress, Borehole geophysics, Modulus of elasticity, *Flat jack method, Poisson ratio, Hydraulic systems, *Triaxial stress.
Identifiers: Borehole deformation gage.

The theory and methods of converting pressure changes in cylindrical and flat jack types of hydrau-

lic borehole gages to rock stress changes are described. Young's modulus and Poisson's ratio of the rock are required along with the stiffness of the hydraulic system. Methods are given for determining these quantities. The 2 types of gages were tested in the laboratory by being inserted into rock cylinders and then subjected to triaxial stresses. The theoretical stress changes and those actually measured were in good agreement. For rock showing plastic flow, the flat jack fluid pressures should be maintained at or above the inherent rock stress if conversion of pressure to stress changes is to be predictable. (USBR)
W71-10408

BLAST-FRACTURING,
Western Co., Richardson, Tex.
For primary bibliographic entry see Field 08A.
W71-10418

BEST WELL DEPTH IN CRYSTALLINE ROCKS,
Universal Oil Products Co., St. Paul, Minn. Johnson Div.
For primary bibliographic entry see Field 08A.
W71-10420

8F. Concrete

LONG-TIME DURABILITY OF CONCRETE IN SEAWATER,
Norges Tekniske Hoegskole, Trondheim.
O. E. Gjorv.
Journal of the American Concrete Institute, Proceedings Vol 68, No 1, p 60-67, Jan, 1971. 8 p, 7 fig, 4 tab, 1 ref.

Descriptors: *Concrete, Concrete additives, Concrete properties, *Concrete technology, Concrete tests, *Durability, *Sea water, Foreign research, Deterioration, Cements, Portland cements, Curing, Flexural strength, Compressive strength, Admixtures, Water-cement ratio, Permeability, Research and development.
Identifiers: *Concrete deterioration, Norway, *Longtime tests, Cement, Content, Undersea aqueduct (Collective).

A comprehensive series of longtime tests was started in 1936 to 1943 to examine the durability of concrete continuously exposed to sea water. More than 2500 concrete test specimens were exposed to sea water at temperatures of 1 to 12 deg C at a station near Trondheim Harbor, Norway. Effects of 18 different cements, addition of trass, precuring, cement content, water-cement ratio, and sea water versus fresh water as mixing water have been examined. Behavior of the concrete was studied by following the changes in flexural and compressive strengths. Results are discussed and interpreted on the basis of chemical analysis and petrographic examination. Important conclusions are: (1) the 18 different cements showed a great variation in resistance to sea water--the less durable the cement, the more important the influence of precuring, cement content, and water-cement ratio; (2) for exposure of the concrete without precuring, only the high alumina cement and the 2 blast funace cements resisted the sea water fairly well; (3) addition of trass generally improved the durability of the concrete; and (4) use of sea water versus fresh water as mixing water showed no significant effect on the concrete behavior. (USBR)
W71-10380

THEORETICAL ANALYSIS OF THE EFFECTS OF AIR VOIDS IN CONCRETE,
West Virginia Univ., Morgantown.
R. B. Martin, and R. R. Haynes.
Journal of the American Concrete Institute, Proceedings Vol 68, No 1, p 36-41, Jan 1971. 6 p, 5 fig, 6 ref, append.

Descriptors: Air entrainment, Effects, *Theoretical analysis, *Voids, Concrete properties, *Concretes, Models, Model studies, Mathematical models, Porosity, Porous materials, Modulus of elasticity, Equations, Sound Waves, Concrete technology.
Identifiers: Air content, Porous concrete.

A physically descriptive model, established for porous materials such as concrete, consists of a solid matrix containing randomly distributed fluid-filled voids of irregular shapes and various sizes. The elastic modulus and speed of sound in the model are investigated analytically, and mathematical relationships between these properties and the porosity are obtained. Using data from a paper by Kaplan, the theoretical results describe the behavior of porous concrete, and some insight is gained into the differences between the effects of entrained air and air caused by incomplete consolidation. The model is amenable to other porous materials. Application to ceramics and bone has been investigated with encouraging results. (USBR)
W71-10381

ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
Dresser Atlas, Houston, Tex.
For primary bibliographic entry see Field 03B.
W71-10428

8G. Materials

METALS THAT RESIST CORROSION SAVE MONEY.
Universal Oil Products Co., St. Paul, Minn. Johnson Div.
For primary bibliographic entry see Field 04B.
W71-10433

09. MANPOWER, GRANTS AND FACILITIES

9C. Research Facilities

BUILDING AND OPERATING A FLOATING LABORATORY,
Washington Univ., Seattle. Fisheries Research Inst.
Lynwood S. Smith.
Laboratory Practice, Vol 19, No 7, p 709-712, July, 1970.

Descriptors: *Laboratories, *On-site laboratories, *Research facilities, Evaluation, Laboratory equipment, Fish handling facilities, Cost allocation, Construction costs.
Identifiers: *Floating facilities, Floating laboratories, Barges.

A laboratory for the study of the environmental physiology of salmon has been designed, built and operated for two years by the Fisheries Research Institute of the University of Washington. The 98.5 ft barge, Kuntuks, is equipped as a self-contained, non-propelled laboratory. Experiences are described and evaluated in comparison with operating an ordinary land-based or shipboard laboratory in terms of convenience, cost and scientific capabilities obtained. (LeGore - Washington)
W71-09986

10. SCIENTIFIC AND TECHNICAL INFORMATION

AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
California Univ., Los Angeles. Dept. of Systems Engineering.
For primary bibliographic entry see Field 06A.
W71-09938

AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
Food and Agriculture Organization of the United Nations, Rome (Italy).
For primary bibliographic entry see Field 05C.
W71-09981

MEASURING EVAPOTRANSPIRATION: A REVIEW,
Hull Univ. (England). Dept. of Geography.
For primary bibliographic entry see Field 02D.
W71-10013

SEDIMENTATION--ANNOTATED BIBLIOGRAPHY OF FOREIGN LITERATURE FOR 1968 and 1969, SURVEY NO. 6,
For primary bibliographic entry see Field 02J.
W71-10034

PHYTOPLANKTON COEFFICIENTS AS A METHOD OF DEFINING THE DEGREE TO WHICH WATER HABITATS ARE TROPHIC (In Polish),
Instytut Rybactwa Srodigdowego, Olsztyn-Kortowo (Poland). Zaklad Hydrobiologii.
For primary bibliographic entry see Field 05C.
W71-10075

TRACE ELEMENTS IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10190

MERCURY IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10191

STRONTIUM IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10192

COPPER IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10193

MANGANESE IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10194

MAGNESIUM IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10195

ZINC IN WATER - A BIBLIOGRAPHY.
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
For primary bibliographic entry see Field 05B.
W71-10196

REAERATION OF STREAMS AND RESERVOIRS ANALYSIS AND BIBLIOGRAPHY,
Bureau of Reclamation, Denver, Colo. Engineering and Research Center.
For primary bibliographic entry see Field 05G.
W71-10202

SUBJECT INDEX

ABATEMENT
ENFORCEMENT AND IMPLEMENTATION OF WATER QUALITY STANDARDS.
W71-10126 06E

FREEDMAN V BOROUGH OF WEST HAZELTON (PUBLIC NUISANCE CAUSED BY DISCHARGE OF SEWAGE INTO DITCH).
W71-10197 06E

ABRASION
DURABILITIES OF SAND SIZE SCHIST AND 'VOLCANIC' ROCK FRAGMENTS DURING FLUVIAL TRANSPORT, ELK CREEK, BLACK HILLS, SOUTH DAKOTA,
W71-10329 02J

ABSORPTION
THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
W71-09982 05A

TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER FLOUNDER, PSEUDO-PLEURONECTES AMERICANUS, FROM THE WEWEANTIC RIVER ESTUARY, MASSACHUSETTS,
W71-10212 05C

ABSTRACTS
AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
W71-09938 06A

SEDIMENTATION--ANNOTATED BIBLIOGRAPHY OF FOREIGN LITERATURE FOR 1968 AND 1969, SURVEY NO. 6,
W71-10038 02J

TRACE ELEMENTS IN WATER - A BIBLIOGRAPHY.
W71-10190 05B

MERCURY IN WATER - A BIBLIOGRAPHY.
W71-10191 05B

STRONTIUM IN WATER - A BIBLIOGRAPHY.
W71-10192 05B

COPPER IN WATER - A BIBLIOGRAPHY.
W71-10193 05B

MANGANESE IN WATER - A BIBLIOGRAPHY.
W71-10194 05B

MAGNESIUM IN WATER - A BIBLIOGRAPHY.
W71-10195 05B

ZINC IN WATER - A BIBLIOGRAPHY.
W71-10196 05B

ACIDIC WATER
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

ACOUSTIC SEDIMENT METERS
METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
W71-10045 02L

ACTIVATED SLUDGE
METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

ADMINISTRATION
STATE WATER QUALITY CONTROL.
W71-10123 06E

CONSERVATION OF OIL AND GAS.
W71-10140 06E

HEALTH MENACES.
W71-10447 06E

ADMINISTRATIVE AGENCIES
GRANTS FOR WATER POLLUTION CONTROL.
W71-09939 06E

CREATION OF THE STATE BOARD OF HEALTH.
W71-09988 06E

RULES FOR THE PREVENTION AND CONTROL OF OIL POLLUTION IN THE WATERS OF THE COMMONWEALTH.
W71-10115 05G

CLEAN WATER BOND LAW OF 1970.
W71-10130 06E

TRANSPORTATION AND DISPOSAL OF WASTE.
W71-10131 06E

WATER QUALITY CONTROL ACT.
W71-10138 06E

POWERS AND DUTIES OF STATE CONSERVATION COMMISSION AND WATER RESOURCES BOARD.
W71-10141 06E

DISPOSAL OF OIL WASTES.
W71-10143 06E

ENVIRONMENTAL QUALITY COMMISSION.
W71-10144 06E

POLLUTION FROM BOATS AND VESSELS,
W71-10161 05G

BY-PASSING OF SEWAGE, INDUSTRIAL, AND OTHER WASTE TREATMENT PLANTS AND EMERGENCY, ACCIDENTAL, OR OTHER EXCESSIVE SPILLS AND DISCHARGES OF SEWAGE, INDUSTRIAL OR OTHER WASTES.
W71-10167 05G

WATER POLLUTION CONTROL.
W71-10223 06E

POWERS AND DUTIES OF GAME AND FISH DEPARTMENT--POLLUTION OF WATERS.
W71-10232 06E

OKLAHOMA RESOURCES DEVELOPMENT ACT OF 1965.
W71-10244 06E

POWERS AND DUTIES OF BOARD OF HEALTH--SANITARY STANDARDS FOR PROTECTION OF WATER RESOURCES.
W71-10249 06E

WATER POLLUTION CONTROL IN COLORADO,
W71-10255 05G

WATER POLLUTION CONTROL (ALLOCATION OF REGULATORY POWER IN TEXAS),
W71-10263 06E

THE TEXAS WATER QUALITY BOARD,
W71-10265 05G

FORTY YEARS OF WATER POLLUTION CONTROL IN WISCONSIN A CASE STUDY,
W71-10275 05G

IMPLEMENTATION OF NATIONAL ENVIRONMENTAL POLICY.
W71-10285 06E

WATER QUALITY ACT.
W71-10290 06E

WATER POLLUTION (STATUTORY AUTHORITY FOR ADMINISTERING POLLUTION CONTROL PROGRAM).
W71-10291 06E

POLLUTION OF WATERS.
W71-10292 06E

WATER CONSERVATION COMMISSION.
W71-10294 06E

STATE FINANCIAL ASSISTANCE TO PUBLIC AGENCIES FOR POLLUTION CONTROL FACILITIES.
W71-10301 06E

STATE WATER POLLUTION CONTROL.
W71-10306 06E

COLORADO WATER POLLUTION CONTROL ACT OF 1966.
W71-10308 06E

ADMINISTRATIVE DECISIONS
DISCHARGES FROM HOUSEBOATS ON OR IN THE WATERS OF THE STATE.
W71-10128 06E

FINANCIAL RESPONSIBILITY FOR OIL POLLUTION CLEANUP.
W71-10133 06E

DISCHARGES OF OIL FOR RESEARCH, DEVELOPMENT AND DEMONSTRATION PURPOSES.
W71-10134 06E

ADMINISTRATIVE PROCEDURE (PERMITS FOR DISCHARGES OR DEPOSITS INTO NAVIGABLE WATERS).
W71-10135 06E

RIVER CONSERVANCY DISTRICTS--POLLUTION CONTROL.
W71-10282 06E

ADSORPTION
ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,
W71-10207 05C

ADSORPTION AND THE RELIABILITY OF TRACE ELEMENTS AS ENVIRONMENT INDICATORS FOR SHALES,
W71-10333 02G

AERATION
HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

REAERATION OF STREAMS AND RESERVOIRS ANALYSIS AND BIBLIOGRAPHY,
W71-10202 05G

AEROBIC CONDITIONS

EFFECT OF MANURE APPLICATION, AERATION, AND SOIL PH ON SOIL NITROGEN TRANSFORMATIONS AND ON CERTAIN SOIL TEST VALUES,
W71-10357 05D

AERODYNAMIC MODELS
RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
W71-10061 08B

AGGREGATES
PARTICLE SIZE, WATER-STABLE AGGREGATES, AND BACTERIAL POPULATIONS IN LAKE SEDIMENTS,
W71-10069 05C

AIR CIRCULATION
A STATISTICAL DATA PLAN FOR BOMEX,
W71-10033 02B

AIR POLLUTION
THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
W71-10105 05C

AIR POLLUTION EFFECTS
THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
W71-10105 05C

ALABAMA
WATER QUALITY CRITERIA.
W71-10271 05G

SOME ASPECTS OF THE ALABAMA WATER IMPROVEMENT COMMISSION'S PROGRAM FOR CONTROL OF WATER POLLUTION.
W71-10272 05G

ALASKA
WATER USE ACT.
W71-10067 06E

WATER POLLUTION CONTROL ACT.
W71-10068 06E

W71-10225 06E

VILLAGE SAFE WATER ACT.
W71-10226 06E

PUGET PEAK AVALANCHE, ALASKA.
W71-10335 02J

POLLUTION AS NUISANCE.
W71-10361 06E

ALGAE
SECONDARY EFFECTS OF NITROGEN IN WATER,
W71-09958 05B

DISSOLVED ORGANIC MATTER AND PHYTOPLANKTONIC PRODUCTIVITY IN MARL LAKES,
W71-10079 05C

PRIMARY PRODUCTION DEPRESSION OF OXYGEN EVOLUTION IN ALGAL CULTURES BY ORGANOPHOSPHORUS INSECTICIDES,
W71-10096 05C

EFFECTS OF ZOOPLANKTON ON PHOTOSYNTHESIS BY ALGAE IN LAKES,
W71-10098 05C

ALKALINE WATER
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

ALKALIS(BASES)
GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K GEOKHIMII ALYUMINIYA V ZONE ENERGICHNOGO GIDROLITICHESKOGO RAZLOZHENIYA ALYUMOSILIKATOV V KORAKH VYVETRIVANIYA).
W71-10341 02K

ALLUVIAL CHANNELS
FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
W71-10173 08B

DURABILITIES OF SAND SIZE SCHIST AND 'VOLCANIC' ROCK FRAGMENTS DURING FLUVIAL TRANSPORT, ELK CREEK, BLACK HILLS, SOUTH DAKOTA,
W71-10329 02J

ALLUVIUM
BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

ABSENCE OF DOWNSTREAM TRANSPORT OF ALLUVIUM BY DOWNCUTTING RIVERS, AS ILLUSTRATED BY THE GAR' RIVER (OTSUTSTVIYE PRODOL'NOGO PERENOSA ALLYUVIYA VREZAYUSHCHEYSYA REKI NA PRIMERE R. GAR'),
W71-10352 02J

EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (VLIYANIYE EROZIONNOGO VREZA RECHNYKH DOLIN NA RAZVITIYE KARSTA),
W71-10353 02J

ALUMINUM
GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K GEOKHIMII ALYUMINIYA V ZONE ENERGICHNOGO GIDROLITICHESKOGO RAZLOZHENIYA ALYUMOSILIKATOV V KORAKH VYVETRIVANIYA).
W71-10341 02K

AMMONIA TOXICITY
THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
W71-10105 05C

AMORTIZATION
CERTIFICATION OF POLLUTION CONTROL FACILITIES FOR TAX RELIEF.
W71-10283 06E

ANALOG MODELS
PARAMETER ESTIMATION FOR AQUIFER EVALUATION,
W71-10024 02F

PARAMETER ESTIMATION IN HYDROLOGY THE STATE OF THE ART,
W71-10025 02F

THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
W71-10053 02F

ANALYTICAL TECHNIQUES
MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
W71-09989 05C

IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
W71-09995 05A

LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
W71-09997 05A

DIGESTION OF OYSTERS FOR THE DETERMINATION OF MERCURY,
W71-10092 05A

ANIMAL BEHAVIOR
AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE AGENTS,
W71-10211 05C

ANOMALOUS WATER
'POLYWATER' AND SWEAT SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

APPLICATION METHODS
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

APPROPRIATION
WATER USE ACT.
W71-10067 06E

AQUATIC PLANTS
INTERRELATIONS OF SEVERAL ABIOTIC FACTORS AND THE HIGHER AQUATIC PLANTS IN A STREAM ECOSYSTEM,
W71-10036 05C

AQUATIC PRODUCTIVITY
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

AQUEOUS SOLUTIONS
NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
W71-09974 01B

'POLYWATER' AND SWEAT SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

AQUICULTURE
TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

AQUIFER CHARACTERISTICS
PARAMETER ESTIMATION FOR AQUIFER EVALUATION,
W71-10024 02F

PARAMETER ESTIMATION IN HYDROLOGY THE STATE OF THE ART,
W71-10025 02F

GROUND WATER RESOURCES AND DEVELOPMENT COASTAL PLAIN REGION ERH JEN CHI--KAOHSIUNG, TAIWAN,
W71-10163 02F

BLAST-FRACTURING,
W71-10418 08A

AQUIFER EVALUATION
PARAMETER ESTIMATION FOR AQUIFER EVALUATION,
W71-10024 02F

PARAMETER ESTIMATION IN HYDROLOGY THE STATE OF THE ART,
W71-10025 02F

AQUIFER STIMULATION
BLAST-FRACTURING,
W71-10418 08A

AQUIFERS
HYDROGEOLOGY OF THE USSR VOLUME 34, THE KARAGANDA OBLAST

(RUSSIAN GIDROGEOLOGIYA SSSR TOM XXXIV, KARAGANDINSKAYA OBLAST),
W71-09963 02F

OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
W71-10051 02F

GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN THE GREAT BASIN, U.S.A.,
W71-10052 02F

THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
W71-10053 02F

INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

ARCTIC
TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

ARCTIC OCEAN
THERMAL INTERACTION OF THE ATMOSPHERE AND THE HYDROSPHERE IN THE ARTIC (RUSSIAN TEPLOVOYE VZAIMODEYSTVIYE ATMOSFERY I GIDROSFERY V ARKTIKE),
W71-09962 02C

ARIZONA
WATER QUALITY CONTROL ACT.
W71-10138 06E

SPECIAL TAX WRITE-OFF FOR POLLUTION CONTROL DEVICES.
W71-10139 06E

CONSERVATION OF OIL AND GAS.
W71-10140 06E

POWERS AND DUTIES OF GAME AND FISH DEPARTMENT--POLLUTION OF WATERS.
W71-10232 06E

STATE BOARD OF HEALTH.
W71-10233 06E

PROHIBITION AGAINST DUMPING WASTE MATERIAL IN WATERWAYS.
W71-10234 06E

HEALTH MENACES.
W71-10447 06E

POLLUTION OF WATERS MAINTENANCE OF THINGS OFFENSIVE OR UNHEALTHFUL PUNISHMENT.
W71-10448 06E

ARKANSAS RIVER
LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

ASHED POULTRY MANURE
THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
W71-10355 05D

ASSESSMENTS
TAX INCENTIVE FOR COMPLIANCE WITH WATER POLLUTION LAWS AND STANDARDS.
W71-10297 06E

ATMOSPHERE
THERMAL INTERACTION OF THE ATMOSPHERE AND THE HYDROSPHERE IN THE ARTIC (RUSSIAN TEPLOVOYE VZAIMODEYSTVIYE ATMOSFERY I GIDROSFERY V ARKTIKE),
W71-09962 02C

A STATISTICAL DATA PLAN FOR BOMEX,
W71-10033 02B

ATOMIC-ABSORPTION
ATOMIC ABSORPTION DETERMINATION OF MICROGRAM QUANTITIES OF MOLYBDENUM IN LAKE WATERS,
W71-10077 07B

ATOMIC-ABSORPTION SPECTROSCOPY
DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
W71-10072 07B

AUGER HOLES
AUGER HOLE SEEPAGE THEORY,
W71-10011 02G

AUTOMATIC CONTROL
BASIC EQUIPMENT IN AUTOMATIC DELIVERY SYSTEMS,
W71-10389 03F

AUTOMATION FOR SMALL IRRIGATION PROJECTS,
W71-10391 03F

AVALANCHES
PUGET PEAK AVALANCHE, ALASKA.
W71-10335 02J

AVOIDANCE
AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE AGENTS,
W71-10211 05C

BACTERIA
SECONDARY EFFECTS OF NITROGEN IN WATER,
W71-09958 05B

PARTICLE SIZE, WATER-STABLE AGGREGATES, AND BACTERIAL POPULATIONS IN LAKE SEDIMENTS,
W71-10069 05C

DISSOLVED ORGANIC COMPOUNDS AND THEIR UTILIZATION IN TWO MARL LAKES,
W71-10091 05C

THE DECOMPOSITION OF URIC ACID IN BUILT UP POULTRY LITTER,
W71-10107 05B

BAHAMAS
BIOCLASTIC TURBIDITE SEDIMENTATION IN COLUMBUS BASIN, BAHAMAS,
W71-10336 02J

BANK EROSION
TENTATIVE LABORATORY INVESTIGATION OF DIVAGATING-RIVER BANK DESTRUCTION (RUSSIAN OPYT ISSLEDOVANIYA V LABORATORNYKH USLOVIYAKH RAZRUSHENIYA BEREGOV (DEYGISHA) NA BLUZHDAYUSHCHIKH REKAKH),
W71-09971 02J

BANK STABILITY
STREAM BANK FAILURE AND ROTATIONAL SLUMPING PRESERVATION AND SIGNIFICANCE IN THE GEOLOGIC RECORD,
W71-10334 02J

BARRIERS
CONCEPT DEVELOPMENT OF A HEAVY DUTY OIL CONTAINMENT SYSTEM FOR USE ON THE HIGH SEAS. VOLUME II. APPENDIX,
W71-10164 05G

BAYLUSCIDE
LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
W71-09997 05A

BEACHES
MAGIC ISLAND COMPLEX, INCLUDING KEWALO BASIN AND ALA WAI BOAT HARBOR, HONOLULU, OAHU, HAWAII. HYDRAULIC MODEL INVESTIGATION,
W71-10003 08B

BED LOAD
RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (RUSSIAN NEKOTORYYE REZUL'TATY LABORATORNYKH ISSLEDOVANIY SKOROSTEY DVIZHENIYA DONNYKJ NANOSOV),
W71-09967 02J

RESULTS OF FIELD INVESTIGATIONS AND CALCULATION OF BED-LOAD DISCHARGE OF THE MZYMTA RIVER (RUSSIAN REZUL'TATY POLEVYKH ISSLEDOVANIY I RASCHET STOKA VLEKOMYKH NANOSOV R. MZYMTY),
W71-09968 02J

HYDRAULIC CHARACTERISTICS OF THE HYDROMETRIC SECTION AT THE MOUTH OF THE SULINA ARM (FRENCH CARACTERISTIQUES HYDRAULIQUES DE LA SECTION HYDROMETRIQUE A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10043 02J

CALCULATION OF COARSE ALLUVIUM DISCHARGE (SANDS) FROM THE SULINA ARM (FRENCH CALCUL DE L'ECOULEMENT DES ALLUVIONS GROSSIERES (SABLES) A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10044 02J

CERTAIN ASPECTS OF THE INFLUENCE ON THE HYDROLOGIC REGIME OF HYDRAULIC WORKS FOR THE IMPROVEMENT OF NAVIGATION IN THE DANUBE DELTA (FRENCH CERTAINS APSECTS DE L'INFLUENCE SUR LE REGIME HYDROLOGIQUE DES TRAVAUX HYDRAULIQUES EFFECTUES POUR L'AMELIORATION DE LA NAVIGATION DANS LE DELTA DU DANUBE),
W71-10058 08B

STUDIES OF THE DISPOSITION OF PARTIAL DISCHARGES OF BED LOAD UPSTREAM OF THE SULINA MOUTH (FRENCH ETUDES DES DISPOSITIFS DE DECHARGEMENT PARTIEL DU DEBIT SOLIDE EN AMONT DE L'EMBOUCHURE DE SULINA),
W71-10060 08B

LONGITUDINAL DISPERSION OF BED-MATERIAL PARTICLES,
W71-10169 02J

BEDS
REGULATIONS GOVERNING THE USE OF WATER RESOURCES AND PUBLIC SUBAQUEOUS LANDS.
W71-10120 06E

BEETLES
BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

BENEFICIAL USE
WATER USE ACT.
W71-10067 06E

BENEFIT-COST ANALYSIS
THE DETERMINATION OF POWER BENEFITS FROM A MULTIPURPOSE WATER PROJECT,
W71-10383 06B

BIBLIOGRAPHIES
AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
W71-09938 06A

AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

MEASURING EVAPOTRANSPIRATION A REVIEW,
W71-10013 02D

SEDIMENTATION--ANNOTATED BIBLIOGRAPHY OF FOREIGN LITERATURE FOR 1968 AND 1969, SURVEY NO. 6,
W71-10034 02J

TRACE ELEMENTS IN WATER - A BIBLIOGRAPHY.
W71-10190 05B

MERCURY IN WATER - A BIBLIOGRAPHY.
W71-10191 05B

STRONTIUM IN WATER - A BIBLIOGRAPHY.
W71-10192 05B

COPPER IN WATER - A BIBLIOGRAPHY.
W71-10193 05B

MANGANESE IN WATER - A BIBLIOGRAPHY.
W71-10194 05B

MAGNESIUM IN WATER - A BIBLIOGRAPHY.
W71-10195 05B

ZINC IN WATER - A BIBLIOGRAPHY.
W71-10196 05B

BIHAR(INDIA)
A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
W71-10015 02B

BILHARZIASIS
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

BICASSAY
MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
W71-09989 05C

IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
W71-09995 05A

BIOCHEMICAL OXYGEN DEMAND
CAGE AND KENNEL WASTE WATER,
W71-10100 05A

TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
W71-10326 05B

CATTLE FEEDLOT WATER QUALITY HYDROLOGY,
W71-10373 05G

BIOCLASTIC SEDIMENTS
BIOCLASTIC TURBIDITE SEDIMENTATION IN COLUMBUS BASIN, BAHAMAS,
W71-10336 02J

BICINDICATORS
INTERRELATIONS OF SEVERAL ABIOTIC FACTORS AND THE HIGHER AQUATIC PLANTS IN A STREAM ECOSYSTEM,
W71-10036 05C

BIOLOGICAL COMMUNITIES
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

BICTURBATION
BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

BLACK HILLS(SD)
DURABILITIES OF SAND SIZE SCHIST AND 'VOLCANIC' ROCK FRAGMENTS DURING FLUVIAL TRANSPORT, ELK CREEK, BLACK HILLS, SOUTH DAKOTA,
W71-10329 02J

BLOCK COPOLYMERS
SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

BOATING REGULATIONS
MARINE TOILET REGULATIONS,
W71-10158 05G

POLLUTION FROM BOATS AND VESSELS,
W71-10161 05G

POLLUTION OF NAVIGABLE WATERS AND POLLUTION BY VESSELS.
W71-10220 06E

STATE MARINE BOARD.
W71-10246 06E

BONNEVILLE BASIN
GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN THE GREAT BASIN, U.S.A.,
W71-10052 02F

BORES
FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
W71-10174 08B

BOTTOM SEDIMENTS
DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
W71-09950 02J

PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (RUSSIAN FOTOGRAFICHESKIY METOD GRANULOMETRICHESKOGO ANALIZA KRUPNYKH NANOSOV),
W71-09966 02J

RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (RUSSIAN NEKOTORYYE REZUL'TATY LABORATORNYKH ISSLEDOVANIY SKOROSTEY DVIZHENIYA DONNYKJ NANOSOV),
W71-09967 02J

THE MOVEMENT OF BOTTOM SEDIMENTS (RUSSIAN DVIZHENIYE DONNYKH NANOSOV),
W71-09969 02J

ORGANIC CARBON AND NITROGEN IN THE SURFACE SEDIMENTS OF LAKES ONTARIO, ERIE, AND HURON,
W71-10327 05A

DEPOSITION OF DEEP-SEA SANDS COMPARISON OF TWO AREAS OF THE CAROLINA CONTINENTAL RISE,
W71-10328 02J

BRACKISH WATER
HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
W71-09991 05C

BRAIDING
MORPHOLOGICAL CHARACTERISTICS OF BRAIDED RIVER CHANNELS IN AN AREA OF TRIBUTARY INFLOW (K VOPROSU O MORFOLOGICHESKIKH OSOBENNOSTYAKH MNOGORUKAVNYKH RECHNYKH RUSEL NA UCHASTKE VPADENIYA PRITOKA),
W71-10343 02J

BREAKWATERS
EFFECTS OF HURRICANE BARRIER ON NAVIGATION CONDITIONS IN EAST PASSAGE, NARRAGANSETT BAY, RHODE ISLAND HYDRAULIC MODEL INVESTIGATION,
W71-10000 08B

STABILITY OF PROPOSED BREAKWATER, BURNS WATERWAY HARBOR, INDIANA HYDRAULIC MODEL INVESTIGATION,
W71-10007 08B

SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN HYDRAULIC MODEL INVESTIGATION,
W71-10008 08B

W71-10009 08B

DESIGNS FOR RUBBLE -MOUND BREAKWATERS, DANA POINT HARBOR, CALIFORNIA,
W71-10199 08B

BRINE DISPOSAL
DISPOSAL OF OIL WASTES.
W71-10142 06E

BULK DENSITY
DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
W71-09950 02J

BUNDLED CONDUCTORS
ESTIMATE OF FORCES EXERTED AGAINST SPACERS WHEN FAULTY CONDITION OCCURS,
W71-10409 08C

BURROWS
BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

BY PRODUCTS
SEAWATER DESALTING WITH CHEMICAL RECOVERY.
W71-09975 03A

CADMIUM
TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

CALIFORNIA
WELL REGULATIONS AND POLLUTION ABATEMENT.
W71-09933 06E

PLACER MINING WATER POLLUTION,
W71-09934 06E

OCEAN WATER-CONTACT SPORTS.
W71-09935 06E

EXISTING LEVELS OF NITRATES IN WATER - THE CALIFORNIA SITUATION,
W71-09955 05B

FLOOD PLAIN INFORMATION, SAN JACINTO RIVER (SAN JACINTO TO RAILROAD CANYON), RIVERSIDE COUNTY, CALIFORNIA.
W71-09973 04A

MANAGEMENT STUDY OF A TRANSITIONAL DELTA SYSTEM,
W71-10057 04A

POLLUTION OF AQUATIC HABITATS.
W71-10081 06E

DISCHARGES INTO CERTAIN WATERS.
W71-10085 06E

WATER QUALITY CONTROL ACT.
W71-10121 06E

DEFINITIONS UNDER STATE WATER QUALITY ACT.
W71-10122 06E

STATE WATER QUALITY CONTROL.
W71-10123 06E

STATE WATER QUALITY CONTROL FUND.
W71-10124 06E

REGIONAL WATER QUALITY CONTROL.
W71-10125 06E

ENFORCEMENT AND IMPLEMENTATION OF WATER QUALITY STANDARDS.
W71-10126 06E

WATER RECLAMATION.
W71-10127 06E

DISCHARGES FROM HOUSEBOATS ON OR IN THE WATERS OF THE STATE.
W71-10128 06E

SPECIAL WATER QUALITY PROVISIONS.
W71-10129 06E

CLEAN WATER BOND LAW OF 1970.
W71-10130 06E

TRANSPORTATION AND DISPOSAL OF WASTE.
W71-10131 06E

FEDERAL ASSISTANCE FOR TREATMENT FACILITIES.
W71-10216 06E

WATER WELLS AND CATHODIC PROTECTION WELLS.
W71-10217 06E

PENALTIES FOR OIL DEPOSITED IN STATE WATERS.
W71-10218 06E

DISPOSAL OF CERTAIN SUBSTANCES OPERATION OF CERTAIN EQUIPMENT.
W71-10219 06E

POLLUTION OF NAVIGABLE WATERS AND POLLUTION BY VESSELS.
W71-10220 06E

POLLUTION OF WATER SUPPLIES AND PUBLIC PLACES.
W71-10221 06E

SEWAGE AND OTHER WASTE PROCEDURE FOR ABATEMENT.
W71-10222 06E

THE SANTA BARBARA OIL SPILL,
W71-10266 05G

REMOVAL OF SUBSTANCES POLLUTING WATERS.
W71-10378 06E

CALIFORNIA WATER PLAN
STATE WATER QUALITY CONTROL.
W71-10123 06E

CANAL LININGS
LABORATORY EVALUATIONS OF CANAL SOIL SEALANTS. AN OPEN AND CLOSED CONDUIT SYSTEMS INVESTIGATION OF FOUR PROPRIETARY MATERIALS PROPOSED AS CANAL SOIL SEALANTS ON SILTY SAND IN LABORATORY PERMEAMETERS,
W71-10201 08D

CANAL SEALANTS
LABORATORY EVALUATIONS OF CANAL SOIL SEALANTS. AN OPEN AND CLOSED CONDUIT SYSTEMS INVESTIGATION OF FOUR PROPRIETARY MATERIALS PROPOSED AS CANAL SOIL SEALANTS ON SILTY SAND IN LABORATORY PERMEAMETERS,
W71-10201 08D

CANAL SEEPAGE
SEEPAGE FORCE ON INTERFACIAL BED PARTICLES,
W71-09943 02J

CANALS
LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

CAPILLARITY
SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
W71-10387 03F

CARBONATE ROCKS
EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (VLIYANIYE EROZIONNOGO VREZA RECHNYKH DOLIN NA RAZVITIYE KARSTA),
W71-10353 02J

CARBONATES
COPPER/BICARBONATE EQUILIBRIA IN SOLUTIONS OF BICARBONATE ION AT CONCENTRATIONS SIMILAR TO THOSE FOUND IN NATURAL WATER,
W71-10323 05A

CASING
PIPE AND CASING IN WATER-WELL DRILLING.
W71-10425 08A

CATHODIC PROTECTION
WATER WELLS AND CATHODIC PROTECTION WELLS.
W71-10217 06E

CAVITATION
CAVITATION PARAMETERS FOR OUTLET VALVES,
W71-10379 08B

CELTIC SEA
TIME VARIATION OF THE DEPTH OF A HIGH SALINITY LAYER IN THE CELTIC SEA,
W71-09949 02K

CEMENTING
ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
W71-10428 03B

CENTRAL ARCTIC
TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

CHANNEL FLOW
FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

CHANNEL IMPROVEMENT
A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 08B

THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (FRENCH L'INFLUENCE DES TRAVAUX D'AMENAGEMENT SUR LA MORPHOLOGIE DES BRAS DU DELTA DU DANUBE),
W71-10059 08B

CHANNEL MORPHOLOGY
DYNAMICS OF THE ILI RIVER DELTA (RUSSIAN DINAMIKA DEL'TY REKI ILI),
W71-09970 02J

NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,
W71-10010 07C

THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (FRENCH L'INFLUENCE DES TRAVAUX D'AMENAGEMENT SUR LA MORPHOLOGIE DES BRAS DU DELTA DU DANUBE),
W71-10059 08B

MORPHOLOGICAL CHARACTERISTICS OF BRAIDED RIVER CHANNELS IN AN AREA OF TRIBUTARY INFLOW (K VOPROSU O MORFOLOGICHESKIKH OSOBENNOSTYAKH MNOGORUKAVNYKH RECHNYKH RUSEL NA UCHASTKE VPADENIYA PRITOKA),
W71-10343 02J

ABSENCE OF DOWNSTREAM TRANSPORT OF ALLUVIUM BY DOWNCUTTING RIVERS, AS ILLUSTRATED BY THE GAR' RIVER (OTSUTSTVIYE PRODOL'NOGO PERENOSA ALLYUVIYA VREZAYUSHCHEYSYA REKI NA PRIMERE R. GAR'),
W71-10352 02J

CHANNEL PIRACY (GEOMORPHOLOGY)
CHANNEL PIRACY ON MONTEREY DEEP-SEA FAN,
W71-09947 02J

CHANNELS
A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
W71-10185 02E

CHARACTERISTICS
ANIMAL WASTES--A MAJOR POLLUTION PROBLEM,
W71-10368 05G

CHECK STRUCTURES
BASIC EQUIPMENT IN AUTOMATIC DELIVERY SYSTEMS,
W71-10389 03F

CHECKLIST
A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
W71-10066 05C

CHEMCONTROL
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,

W71-09994 05A

TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

CHEMICAL ANALYSIS
IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
W71-09995 05A

LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
W71-09997 05A

CHEMICAL PROPERTIES
PROPERTIES OF FARM ANIMAL EXCRETA,
W71-10109 05A

CHEMICALS
A REVIEW OF STUDIES ON THE BOTTOM SEDIMENTS OF LAKES (IN POLISH),
W71-10095 05C

CHLORELLA
THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
W71-10090 05C

CHLORINATED HYDROCARBON PESTICIDES
DDT RESIDUES IN MARINE PHYTOPLANKTON INCREASE FROM 1955 TO 1969,
W71-09984 05A

ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

RESIDUES OF DDT, DDE AND DDD IN FISH IN THE SASKATCHEWAN RIVER AFTER USING DDT AS A BLACKFLY LARVICIDE FOR TWENTY YEARS,
W71-10086 05C

TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

CHROMIUM
TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

CITIES
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

URBAN SOURCES OF NITRATES,
W71-09959 05B

CITY OF SPRINGFIELD V NORTH FORK OUTLET DRAINAGE DIST (PREVENTING DRAINAGE DISTRICT FROM STRAIGHTENING RIVER).
W71-10203 06E

COOK V CITY OF DU QUOIN (CITY'S LIABILITY FOR POLLUTION OF STREAM).
W71-10204 06E

AUTO CLUB OF ST PAUL V CITY OF WHITE BEAR LAKE (RIGHT OF CITY TO CONSTRUCT SEWAGE OUTLET INTO LAKE).
W71-10311 06E

CLASS-ACTION LAWSUITS
ENVIRONMENT REPORT--BILLS TO AUTHORIZE CLASS ACTIONS RECOGNIZE RIGHT TO CLEAN ENVIRONMENT,
W71-10274 06E

CLAYS
A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
W71-10415 04A

CLIMATIC DATA
RECURRING TEXAS DROUGHTS,
W71-10410 07C

CLOUDBURSTS
FLOOD FLOW DOWNSTREAM FROM SLIDE,
W71-10316 02J

COASTAL AQUIFERS
OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

COASTS
A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
W71-10066 05C

COHESIONLESS SOILS
TECHNIQUE FOR STUDY OF GRANULAR MATERIALS,
W71-10405 08D

COLORADO
WATER POLLUTION CONTROL IN COLORADO,
W71-10255 05G

WATER POLLUTION CONTROL IN COLORADO.
W71-10258 05G

RULES AND GUIDELINES FOR WATER POLLUTION CONTROL AT LIVESTOCK CONFINEMENT AREAS AND GUIDELINES FOR CONSTRUCTION OF SEALED EVAPORATION AND RETENTION PONDS.
W71-10259 05G

CONCERNING WATER POLLUTION, AND PROVIDING PENALTIES FOR VIOLATIONS RELATING TO POLLUTION OF STATE WATERS.
W71-10295 06E

COLORADO WATER POLLUTION CONTROL ACT OF 1966.
W71-10308 06E

POWERS OF GOVERNING BODIES.
W71-10309 06E

LIABILITY FOR THE FLOODING OF MINE WASTES UPON ANOTHER'S PROPERTY.
W71-10310 06E

COLORIMETRY
IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
W71-09995 05A

LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
W71-09997 05A

COLUMBIA RIVER
COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

COMMUNITY METABOLISM
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

COMPOSITE MEMBRANES
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

COMPUTER PROGRAMS
QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
W71-09936 05B

OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
W71-10018 02E

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

CERTAIN ASPECTS OF THE INFLUENCE ON THE HYDROLOGIC REGIME OF HYDRAULIC WORKS FOR THE IMPROVEMENT OF NAVIGATION IN THE DANUBE DELTA (FRENCH CERTAINS ASPECTS DE L'INFLUENCE SUR LE REGIME HYDROLOGIQUE DES TRAVAUX HYDRAULIQUES EFFECTUES POUR L'AMELIORATION DE LA NAVIGATION DANS LE DELTA DU DANUBE),
W71-10058 08B

A DYNAMIC PROGRAMMING ALGORITHM FOR THE OPERATION OF THE GREAT LAKES,
W71-10076 06B

FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
W71-10174 08B

CONCENTRATION FACTORS
MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
W71-10206 05C

CONCRETE
LONG-TIME DURABILITY OF CONCRETE IN SEAWATER,
W71-10380 08F

CONCRETE DETERIORATION
LONG-TIME DURABILITY OF CONCRETE IN SEAWATER,
W71-10380 08F

CONCRETE TECHNOLOGY
LONG-TIME DURABILITY OF CONCRETE IN SEAWATER,
W71-10380 08F

CONCRETES
THEORETICAL ANALYSIS OF THE EFFECTS OF AIR VOIDS IN CONCRETE,
W71-10381 08F

CONDEMNATION
SEADADE INDUSTRIES, INC V FLORIDA POWER AND LIGHT CO (CONDEMNING LAND PENDING APPROVAL OF FACILITY BY POLLUTION CONTROL AUTHORITIES).
W71-10303 06E

CONFINED WATER
VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
W71-10318 02F

CONFINEMENT PENS
RULES AND GUIDELINES FOR WATER POLLUTION CONTROL AT LIVESTOCK CONFINEMENT AREAS AND GUIDELINES FOR CONSTRUCTION OF SEALED EVAPORATION AND RETENTION PONDS.

W71-10259 05G

CONSERVATION
CONSTITUTIONAL POLICY FAVORING CONSERVATION.
W71-10288 06E

CONSTITUTIONAL PROVISIONS
CONSTITUTIONAL POLICY FAVORING CONSERVATION.
W71-10288 06E

CONSTRUCTION COSTS
STATE WATER QUALITY CONTROL FUND.
W71-10124 06E

WATER POLLUTION CONTROL (CONSTRUCTION GRANTS FOR POLLUTION CONTROL FACILITIES).
W71-10251 06E

CONSTRUCTION MATERIALS
CONTROL STRUCTURE, LITTLE SIOUX RIVER, IOWA, HYDRAULIC MODEL INVESTIGATION,
W71-10002 08B

STABILITY OF PROPOSED BREAKWATER, BURNS WATERWAY HARBOR, INDIANA HYDRAULIC MODEL INVESTIGATION,
W71-10007 08B

PIPE AND CASING IN WATER-WELL DRILLING.
W71-10425 08A

CONTAMINATION (WATER)
CONSERVATION OF OIL AND GAS.
W71-10140 06E

CONTINENTAL SHELF
CHANNEL PIRACY ON MONTEREY DEEP-SEA FAN,
W71-09987 02J

CONTINENTAL SLOPE
CHANNEL PIRACY ON MONTEREY DEEP-SEA FAN,
W71-09987 02J

DEPOSITION OF DEEP-SEA SANDS COMPARISON OF TWO AREAS OF THE CAROLINA CONTINENTAL RISE,
W71-10328 02J

CONTRACT ADMINISTRATION
BETTER SPECIFICATIONS FOR UNDERGROUND WORK,
W71-10401 06B

COORDINATION
MISSOURI WATER PLAN, STATE LAWS, POLICIES AND PROGRAMS PERTAINING TO WATER AND RELATED LAND RESOURCES.
W71-10270 06E

ENVIRONMENTAL STATEMENTS--PROPOSED GUIDELINES ON PREPARATION AND COORDINATION.
W71-10287 06F

COPPER
REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
W71-09987 05C

COPPER IN WATER - A BIBLIOGRAPHY.
W71-10193 05B

TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

COPPER/BICARBONATE EQUILIBRIA IN SOLUTIONS OF BICARBONATE ION AT CONCENTRATIONS SIMILAR TO THOSE FOUND IN NATURAL WATER,
W71-10323 05A

CORES
DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
W71-09950 02J

CORN ROOTWORMS
EFFECTS OF MANURE APPLICATIONS AND MITE PREDATION ON CORN ROOTWORM POPULATIONS IN MINNESOTA,
W71-10359 05C

CORROSION
METALS THAT RESIST CORROSION SAVE MONEY.
W71-10433 04B

COST COMPARISONS
ECONOMICS OF WATER POLLUTION CONTROL FOR CATTLE FEEDLOT OPERATIONS,
W71-10377 05G

COSTS
PENALTIES FOR OIL DEPOSITED IN STATE WATERS.
W71-10218 06E

REMOVAL OF SUBSTANCES POLLUTING WATERS.
W71-10378 06E

COUNTERPART
THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
W71-10090 05C

CROP RESPONSE
THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
W71-10355 05D

CROSS SPECTRAL ANALYSIS
CROSS SPECTRAL ANALYSIS OF PRECIPITATION AND STREAMFLOW DATA SYSTEMS,
W71-10037 07C

CTENOPHORES
TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

CYANOPHYTA
SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
W71-10070 05C

CYCLES
RECURRING TEXAS DROUGHTS,
W71-10410 07C

CYCLING NUTRIENTS
RECYCLED POULTRY NUTRIENTS,
W71-10365 05D

CYTOLOGICAL STUDIES
THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
W71-10090 05C

DAMAGES
FINANCIAL RESPONSIBILITY FOR OIL POLLUTION CLEANUP.
W71-10133 06E

BEAN V SEARS, ROEBUCK AND CO (POLLUTION OF WELL HELD PERMANENT DAMAGE TO REAL PROPERTY),
W71-10155 06E

WATER POLLUTION CONTROL ACT.
W71-10225 06E

DISCHARGING REFUSE INTO DRAINAGE FACILITIES PROHIBITED.
W71-10247 06E

DAMS
OUTLET STRUCTURE FOR EAU GALLE RESERVOIR, EAU GALLE RIVER, WISCONSIN, HYDRAULIC MODEL INVESTIGATION,
W71-09998 08B

NAVIGATION CONDITIONS AT MILLERS FERRY LOCK AND DAM, ALABAMA RIVER, ALABAMA. HYDRAULIC MODEL INVESTIGATION,
W71-09999 08B

MODERNIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY HYDRAULIC MODEL INVESTIGATION,
W71-10001 08B

NAVIGATION CONDITIONS AT MCALPINE LOCKS AND DAM, OHIO RIVER. HYDRAULIC MODEL INVESTIGATION,
W71-10005 08B

NAVIGATION CONDITIONS AT COLUMBIA LOCK AND DAM, OUACHITA RIVER LOUISANA,
W71-10006 08B

DANUBE DELTA
THE LAWS OF ICE PROCESSES IN DELTAS,
W71-10042 02C

CALCULATION OF COARSE ALLUVIUM DISCHARGE (SANDS) FROM THE SULINA ARM (FRENCH CALCUL DE L'ECOULEMENT DES ALLUVIONS GROSSIERES (SABLES) A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10044 02J

CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 08B

CERTAIN ASPECTS OF THE INFLUENCE ON THE HYDROLOGIC REGIME OF HYDRAULIC WORKS FOR THE IMPROVEMENT OF NAVIGATION IN THE DANUBE DELTA (FRENCH CERTAINS ASPECTS DE L'INFLUENCE SUR LE REGIME HYDROLOGIQUE DES TRAVAUX HYDRAULIQUES EFFECTUES POUR L'AMELIORATION DE LA NAVIGATION DANS LE DELTA DU DANUBE),
W71-10058 08B

DANUBE RIVER
DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL (FRENCH DONNEES SUR LES CARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

DATA COLLECTIONS
HYDRAULIC CHARACTERISTICS OF THE HYDROMETRIC SECTION AT THE MOUTH OF THE SULINA ARM (FRENCH CARACTERISTIQUES HYDRAULIQUES DE LA SECTION HYDROMETRIQUE A L'EMBOUCHURE DU BRAS DE SULINA),

W71-10043 02J

METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
W71-10045 02L

EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
W71-10314 07A

DATA PROCESSING
SPECIES DIVERSITY SPECIES ABUNDANCE OF FISH POPULATIONS AN EXAMINATION OF VARIOUS METHODS,
W71-10210 07C

DECISION MAKING
EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
W71-10314 07A

DECISION THEORY
EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
W71-10314 07A

DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

DECOMPOSING ORGANIC MATTER
THE DECOMPOSITION OF URIC ACID IN BUILT UP POULTRY LITTER,
W71-10107 05B

DELAWARE
REGULATIONS GOVERNING THE USE OF WATER RESOURCES AND PUBLIC SUBAQUEOUS LANDS.
W71-10120 06E

INSTALLATION AND OPERATION OF SEPTIC TANK SEWAGE DISPOSAL SYSTEMS,
W71-10256 05D

WATER QUALITY STANDARDS.
W71-10257 05G

DELAWARE RIVER
REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
W71-10320 04A

DELAWARE RIVER BASIN COMMISSION
BASIN REGULATIONS--WATER QUALITY (WATER QUALITY STANDARDS, ABATEMENT, AND ENFORCEMENT PROCEDURES).
W71-10116 05G

ANNUAL REPORT 1970.
W71-10268 05G

ANNUAL REPORT 1968.
W71-10269 05G

DELTAS
DYNAMICS OF THE ILI RIVER DELTA (RUSSIAN DINAMIKA DEL'TY REKI ILI),
W71-09970 02J

HYDRAULIC CALCULATION OF WATER DISCHARGE AND LEVELS IN RIVER DELTAS,
W71-10038 02E

ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
W71-10040 02E

DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL (FRENCH DONNEES SUR LES CHARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

THE LAWS OF ICE PROCESSES IN DELTAS,
W71-10042 02C

HYDRAULIC CHARACTERISTICS OF THE HYDROMETRIC SECTION AT THE MOUTH OF THE SULINA ARM (FRENCH CARACTERISTIQUES HYDRAULIQUES DE LA SECTION HYDROMETRIQUE A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10043 02J

CALCULATION OF COARSE ALLUVIUM DISCHARGE (SANDS) FROM THE SULINA ARM (FRENCH CALCUL DE L'ECOULEMENT DES ALLUVIONS GROSSIERES (SABLES) A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10044 02J

THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
W71-10046 02K

THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
W71-10048 02C

ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
W71-10049 02C

REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
W71-10051 02F

GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN THE GREAT BASIN, U.S.A.,
W71-10052 02F

THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
W71-10053 02F

CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 [illegible]

MANAGEMENT STUDY OF A TRANSITIONAL DELTA SYSTEM,
W71-10057 04A

RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
W71-10061 08B

DENITRIFICATION
CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
W71-09960 05B

DENSITY
DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
W71-09950 02J

DEPOSITION(SEDIMENTS)
MORPHOLOGICAL CHARACTERISTICS OF BRAIDED RIVER CHANNELS IN AN AREA OF TRIBUTARY INFLOW (K VOPROSU O MORFOLOGICHESKIKH OSOBENNOSTYAKH MNOGORUKAVNYKH RECHNYKH RUSEL NA UCHASTKE VPADENIYA PRITOKA),
W71-10343 02J

DESALINATION
SEAWATER DESALTING WITH CHEMICAL RECOVERY.
W71-09975 03A

SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

DESALINATION PROCESSES
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

DESIGN CRITERIA
LICENSING OF PRODUCTION AND UTILIZATION FACILITIES (NUCLEAR POWER REACTORS).
W71-10286 06E

DESIGN FLOOD
DESIGN LEVELS IN THE TRANSITION ZONE BETWEEN THE TIDAL REACH AND THE RIVER REGIME REACH,
W71-10039 08B

DETERGENTS
AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE AGENTS,
W71-10211 05C

DEVILS LAKE(ND)
PRIMARY PRODUCTIVITY MEASUREMENTS AT DEVILS LAKE, NORTH DAKOTA,
W71-10062 05C

ZOOPLANKTON-PHYTOPLANKTON RELATIONSHIPS IN DEVILS LAKE, NORTH DAKOTA,
W71-10063 05C

DEWATERING
WELL TECHNOLOGY SERVES THE MINING INDUSTRY.
W71-10423 04B

DIELDRIN
CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER FLOUNDER, PSEUDO-PLEURONECTES AMERICANUS, FROM THE NEWEANTIC RIVER ESTUARY, MASSACHUSETTS,
W71-10212 05C

DIELECTRIC PROPERTIES
AGING OF OIL-FILLED CABLE DIELECTRICS,
W71-10404 08C

DIETS
VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

DIFFUSION
AN INTRODUCTION TO DETERMINATION OF ESTUARINE ASSIMILATIVE CAPACITY,
W71-10093 05B

DIGESTION
DIGESTION OF OYSTERS FOR THE DETERMINATION OF MERCURY,
W71-10092 05A

VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

DIGITAL COMPUTERS
AQUIFER MODEL RESEARCH REVIEWED.
W71-10416 02F

DIMENSIONAL ANALYSIS
DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
W71-10177 08B

DISASTERS
THE SANTA BARBARA OIL SPILL,
W71-10266 05G

DISCHARGE MEASUREMENT
RESULTS OF FIELD INVESTIGATIONS AND CALCULATION OF BED-LOAD DISCHARGE OF THE MZYMTA RIVER (RUSSIAN REZUL'TATY POLEVYKH ISSLEDOVANIY I RASCHET STOKA VLEKOMYKH NANOSOV R. MZYMTY),
W71-09968 02J

DISCHARGE(WATER)
DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
W71-09942 05B

SEDIMENT DISCHARGE OF RIVERS IN THE MARITIME TERRITORY (RUSSIAN STOK NANOSOV REK PRIMORSKOGO KRAYA),
W71-09965 02J

RESULTS OF FIELD INVESTIGATIONS AND CALCULATION OF BED-LOAD DISCHARGE OF THE MZYMTA RIVER (RUSSIAN REZUL'TATY POLEVYKH ISSLEDOVANIY I RASCHET STOKA VLEKOMYKH NANOSOV R. MZYMTY),
W71-09968 02J

CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORREKTSII),
W71-10184 04A

CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN K RASCHETU VODNOGO BALANSA OZ. KHANKA),
W71-10186 02H

DISEASE CONTROL
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

DISEASES
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

DISINFECTION
DISINFECTING WELLS AND WATER PIPING.
W71-10431 08A

DISPERSION
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

LONGITUDINAL DISPERSION OF BED-MATERIAL PARTICLES,
W71-10169 02J

SURFACE DISTURBANCE FROM SUBMERGED JET,
W71-10171 08B

DISPOSAL
EFFECTS OF MANURE APPLICATIONS AND MITE PREDATION ON CORN ROOTWORM POPULATIONS IN MINNESOTA,
W71-10359 05C

ANIMAL WASTE DISPOSAL BECOMES A MORE DIFFICULT PROBLEM,
W71-10362 05D

MANAGEMENT OF ANIMAL FEEDLOT WASTES -- LAND SPREADING AS A DISPOSAL PROCESS,
W71-10370 05G

ECONOMICS OF WATER POLLUTION CONTROL FOR CATTLE FEEDLOT OPERATIONS,
W71-10377 05G

DISSOLVED ORGANIC PHOSPHORUS
DISSOLVED ORGANIC PHOSPHORUS EXCRETION BY MARINE PHYTOPLANKTON,
W71-10083 05C

DISSOLVED OXYGEN
EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

REAERATION OF STREAMS AND RESERVOIRS ANALYSIS AND BIBLIOGRAPHY,
W71-10202 05G

TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
W71-10326 05B

DISSOLVED SOLIDS
DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
W71-09942 05B

DISSOLVED SOLIDS-DISCHARGE RELATIONS
DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
W71-09942 05B

DISTRIBUTION PATTERNS
NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,
W71-10010 07C

A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
W71-10015 02B

DIVERSION STRUCTURES
STUDIES OF THE DISPOSITION OF PARTIAL DISCHARGES OF BED LOAD UPSTREAM OF THE SULINA MOUTH (FRENCH ETUDES DES DISPOSITIFS DE DECHARGEMENT PARTIEL DU DEBIT SOLIDE EN AMONT DE L'EMBOUCHURE DE SULINA),
W71-10060 08B

DIVERSITY INDEX
SPECIES DIVERSITY SPECIES ABUNDANCE OF FISH POPULATIONS AN EXAMINATION OF VARIOUS METHODS,
W71-10210 07C

DOCUMENTATION
SEDIMENTATION--ANNOTATED BIBLIOGRAPHY OF FOREIGN LITERATURE FOR 1968 AND 1969, SURVEY NO. 6,
W71-10034 02J

DOMESTIC WATER
TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
W71-09961 05B

POLLUTION OF IRRIGATION WORKS, WATER SUPPLIES, AND WATER COURSES.
W71-09983 06E

POWERS OF TOWNS--WATER AND LIGHT.
W71-10444 06E

DRAINAGE
IMPROVEMENT OF WATERCOURSES OR DRAINS WEST OF CASCADES.
W71-10438 06E

DRAINAGE DENSITY
SIMULATION MODEL OF STREAM CAPTURE,
W71-10337 02E

DRAINAGE DISTRICTS
DRAINAGE DISTRICTS--POLLUTION CONTROL.
W71-10151 06E

DRAINAGE PATTERNS(GEOLOGIC)
SIMULATION MODEL OF STREAM CAPTURE,
W71-10337 02E

DRAINAGE PROGRAMS
IMPROVEMENT OF WATERCOURSES OR DRAINS WEST OF CASCADES.
W71-10438 06E

DRAWDOWN
PHREATIC SURFACE LOCATION AFTER DRAWDOWN,
W71-10390 08D

DREDGING
DISPOSAL OF CERTAIN SUBSTANCES OPERATION OF CERTAIN EQUIPMENT.
W71-10219 06E

DRIED POULTRY WASTE
RECYCLED POULTRY NUTRIENTS,
W71-10365 05D

DRILLING
BEST WELL DEPTH IN CRYSTALLINE ROCKS,
W71-10420 08A

ESTIMATING WATER WELL SPECIFIC CAPACITY UTILIZING PERMEABILITY OF DISTURBED SAMPLES,
W71-10421 08A

NEW TOOLS FOR NEW AND OLD WELLS,
W71-10422 08A

RESEARCH IS GUIDE FOR ESTIMATING WELL COSTS.
W71-10424 08A

PIPE AND CASING IN WATER-WELL DRILLING.
W71-10425 08A

DISINFECTING WELLS AND WATER PIPING.
W71-10431 08A

METALS THAT RESIST CORROSION SAVE MONEY.
W71-10433 04B

DROP STRUCTURE
DROP STRUCTURE FOR GERING VALLEY PROJECT, SCOTTSBLUFF COUNTY, NEBRASKA HYDRAULIC MODEL INVESTIGATION,
W71-10004 08B

DROP STRUCTURES
CONTROL STRUCTURE, LITTLE SIOUX RIVER, IOWA, HYDRAULIC MODEL INVESTIGATION,
W71-10002 08B

DROUGHTS
A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
W71-10015 02B

REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
W71-10320 04A

RECURRING TEXAS DROUGHTS,

DRY-EXC
W71-10410 07C

DRYING
TURNING WASTES INTO PROFITS,
W71-10363 05D

DUNES
FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
W71-10173 08B

WIND-ORIENTED GASTROPOD SHELLS AS INDICATORS OF PALEOWIND DIRECTION,
W71-10330 02J

DURABILITY
LONG-TIME DURABILITY OF CONCRETE IN SEAWATER,
W71-10380 08F

DUSTS
POULTRY DUST ORIGIN AND COMPOSITION,
W71-10110 05A

DYNAMIC PROGRAMMING
A DYNAMIC PROGRAMMING ALGORITHM FOR THE OPERATION OF THE GREAT LAKES,
W71-10076 06B

EARTH DAMS
THE SELETAR SCHEME, SINGAPORE,
W71-10382 03B

EARTHQUAKES
PUGET PEAK AVALANCHE, ALASKA.
W71-10335 02J

EASTERN CANADA
A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
W71-10066 05C

ECOLOGY
ENVIRONMENTAL QUALITY CONTROL.
W71-10289 06E

ECONOMIC FEASIBILITY
ECONOMICS OF WATER POLLUTION CONTROL FOR CATTLE FEEDLOT OPERATIONS,
W71-10377 05G

ECONOMIC IMPACT
PLANNING ANALYSIS FOR THE NON-MARKET VALUES OF WATER RESOURCES WITH PARTICULAR EMPHASIS ON RECREATION,
W71-09944 06B

ELECTRIC CABLES
AGING OF OIL-FILLED CABLE DIELECTRICS,
W71-10404 08C

ELECTRICAL FAULTS
ESTIMATE OF FORCES EXERTED AGAINST SPACERS WHEN FAULTY CONDITION OCCURS,
W71-10409 08C

ELECTRICAL RESISTANCE
NONDESTRUCTIVE WATER CONTENT DETERMINATION,
W71-10338 02G

ELECTRICAL STUDIES
ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
W71-10049 02C

ENERGY BUDGET
ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (WITH GERMAN SUMMARY),
W71-10064 05C

ENGINEERING GEOLOGY
HYDROGEOLOGY OF THE USSR VOLUME 34, THE KARAGANDA OBLAST (RUSSIAN GIDROGEOLOGIYA SSSR TOM XXXIV, KARAGANDINSKAYA OBLAST),
W71-09963 02F

ENVIRONMENTAL EFFECTS
THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
W71-09982 05A

THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
W71-10105 05C

COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

IMPLEMENTATION OF NATIONAL ENVIRONMENTAL POLICY.
W71-10285 06E

ENVIRONMENTAL STATEMENTS--PROPOSED GUIDELINES ON PREPARATION AND COORDINATION.
W71-10287 06E

SEADADE INDUSTRIES, INC V FLORIDA POWER AND LIGHT CO (CONDEMNING LAND PENDING APPROVAL OF FACILITY BY POLLUTION CONTROL AUTHORITIES).
W71-10303 06E

ENVIRONMENTAL SANITATION
SOLID WASTE DISPOSAL STANDARDS.
W71-10114 05G

STANDARDS OF PERFORMANCE FOR MARINE SANITATION DEVICES.
W71-10136 06E

STATE BOARD OF HEALTH.
W71-10233 06E

FUNCTIONS OF HEALTH DEPARTMENTS (WATER POLLUTION AND QUALITY CONTROL).
W71-10236 06E

ADMINISTRATION OF POLLUTED WATERS,
W71-10253 06E

ENVIRONMENTAL CONTROL ACT.
W71-10280 06E

ENVIRONMENTAL QUALITY CONTROL.
W71-10289 06E

MINIMUM STANDARDS OF SANITATION AND HEALTH PROTECTION MEASURES.
W71-10437 06E

HEALTH MENACES.
W71-10447 06E

EPHEMERAL STREAMS
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10014 02A

EPOXY RESINS
TECHNIQUE FOR STUDY OF GRANULAR MATERIALS,
W71-10405 08D

EQUITABLE APPORTIONMENT
ANNUAL REPORT 1968.
W71-10269 05G

EROSION
CHANNEL PIRACY ON MONTEREY DEEP-SEA FAN,
W71-09947 02J

EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (VLIYANIYE EROZIONNOGO VREZA RECHNYKH DOLIN NA RAZVITIYE KARSTA),
W71-10353 02J

MAJOR PROBLEMS OF WATER POLLUTION CREATED BY AGRICULTURAL PRACTICES,
W71-10374 05G

EROSION CONTROL
DROP STRUCTURE FOR GERING VALLEY PROJECT, SCOTTSBLUFF COUNTY, NEBRASKA HYDRAULIC MODEL INVESTIGATION,
W71-10004 08B

ESTUARIES
METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
W71-10045 02L

WATER QUALITY MODELING OF ESTUARIES,
W71-10047 05G

AN INTRODUCTION TO DETERMINATION OF ESTUARINE ASSIMILATIVE CAPACITY,
W71-10093 05B

EUTROPHICATION
PHYTOPLANKTON COEFFICIENTS AS A METHOD OF DEFINING THE DEGREE TO WHICH WATER HABITATS ARE TROPHIC (IN POLISH),
W71-10075 05C

CONTRIBUTION OF FERTILIZERS TO WATER POLLUTION,
W71-10372 05G

EVALUATION
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

SPECIES DIVERSITY SPECIES ABUNDANCE OF FISH POPULATIONS AN EXAMINATION OF VARIOUS METHODS,
W71-10210 07C

OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
W71-10413 04B

EVAPORATION
ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
W71-10026 03B

TOTAL EVAPORATION IN THE AMUR OBLAST AND MARITIME TERRITORY DURING SUMMER MONTHS (RUSSIAN SUMMARNOYE ISPARENIYE ZA LETNIYE MESYATSY V AMURSKO-PRIMORSKOY OBLASTI),
W71-10187 02D

EVAPOTRANSPIRATION
MEASURING EVAPOTRANSPIRATION A REVIEW,
W71-10013 02D

EXCESSIVE PRECIPITATION
FLOOD FLOW DOWNSTREAM FROM SLIDE,
W71-10316 02J

EXCRETION

DISSOLVED ORGANIC PHOSPHORUS EXCRETION BY MARINE PHYTOPLANKTON,
W71-10083 05C

EXPERIMENTAL FARMS
PAHRUMP FIELD LABORATORY,
W71-10414 03F

EXPERIMENTAL WATERSHEDS
DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

EXPLOSIVES(WELLS)
BLAST-FRACTURING,
W71-10418 08A

EXTERNAL FORCES
ESTIMATE OF FORCES EXERTED AGAINST SPACERS WHEN FAULTY CONDITION OCCURS,
W71-10409 08C

FAR EAST
PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
W71-10180 04A

CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORREKTSII),
W71-10184 04A

A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
W71-10185 02F

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I VLAGI),
W71-10188 02D

STORM FLOOD FORMATION PROCESSES (RUSSIAN PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
W71-10189 02E

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10345 04A

A SHORT-TERM FORECAST OF INFLOW TO THE RESERVOIR OF THE ZEYSKAYA HYDROELECTRIC POWER PLANT (KRATKOSROCHNYY PROGNOZ PRITOCHNOSTI V VODOKHRANILISHCHE ZEYSKOY GES),
W71-10347 04A

HEAT FLOW TO MELTING ICE ON THE USSURI RIVER (TEPLOPRIKHOD K TAYUSHCHEMU L'DU REKI USSURI),
W71-10349 02C

FARM MANAGEMENT
PAHRUMP FIELD LABORATORY,
W71-10414 03F

FARM WASTE
MANAGEMENT OF ANIMAL FEEDLOT WASTES -- LAND SPREADING AS A DISPOSAL PROCESS,
W71-10370 05G

FARM WASTES
CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
W71-09960 05B

AIR POLLUTION FROM ANIMAL WASTES,
W71-10101 05A

THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
W71-10105 05C

THE DECOMPOSITION OF URIC ACID IN BUILT UP POULTRY LITTER,
W71-10107 05B

PROPERTIES OF FARM ANIMAL EXCRETA,
W71-10109 05A

POULTRY DUST ORIGIN AND COMPOSITION,
W71-10110 05A

RULES AND GUIDELINES FOR WATER POLLUTION CONTROL AT LIVESTOCK CONFINEMENT AREAS AND GUIDELINES FOR CONSTRUCTION OF SEALED EVAPORATION AND RETENTION PONDS.
W71-10259 05G

IDENTIFICATION OF METABOLITES OF N - (1, 1-DIMETHYLPROPYNYL) - 3,5 DICHLOROBENZAMIDE IN RAT AND COW URINE AND RAT FECES,
W71-10356 05A

2ND COMPENDIUM OF ANIMAL WASTE MANAGEMENT.
W71-10366 05G

ANIMAL WASTES--A MAJOR POLLUTION PROBLEM,
W71-10368 05G

DESIGN FOR FEEDLOT WASTE MANAGEMENT - HISTORY AND CHARACTERISTICS,
W71-10371 05G

MAJOR PROBLEMS OF WATER POLLUTION CREATED BY AGRICULTURAL PRACTICES,
W71-10374 05G

FARMWASTES
LABORATORY STUDIES OF AEROBIC STABILIZATION OF SWINE WASTE,
W71-10106 05D

FEDERAL GOVERNMENT
OCEAN POLLUTION MESSAGE,
W71-10132 06E

FEDERAL JURISDICTION
OHIO V WYANDOTTE CHEMICALS CORP (SUPREME COURT DECLINES ORIGINAL JURISDICTION OVER WATER POLLUTION COMPLAINT BY STATE),
W71-10153 06E

FEDERAL WATER POLLUTION CONTROL ACT
WATER POLLUTION CONTROL FACILITIES - FINANCING.
W71-10224 06E

FEEDLOT POLLUTION
THE MOUNTING PROBLEM OF CATTLE FEEDLOT POLLUTION,
W71-10111 05G

FEEDLOT RUNOFF
REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
W71-10369 05G

FEEDLOT SIZE
ECONOMICS OF WATER POLLUTION CONTROL FOR CATTLE FEEDLOT OPERATIONS,
W71-10377 05G

FEEDLOT WASTES
CATTLE FEEDLOT WATER QUALITY HYDROLOGY,
W71-10373 05G

FEEDLOTS
DESIGN FOR FEEDLOT WASTE MANAGEMENT - HISTORY AND CHARACTERISTICS,
W71-10371 05G

FEEDLOTS RUNOFF
ANIMAL WASTES--A MAJOR POLLUTION PROBLEM,
W71-10368 05G

FERTILIZERS
POLLUTION - HOW MUCH OF A PROBLEM COMES FROM FERTILIZERS,
W71-10099 05C

FINANCING
STATE WATER QUALITY CONTROL FUND.
W71-10124 06E

POLLUTION CONTROL BONDS.
W71-10149 06E

FEDERAL ASSISTANCE FOR TREATMENT FACILITIES.
W71-10216 06E

WATER POLLUTION CONTROL FACILITIES - FINANCING.
W71-10224 06E

STATE FINANCIAL ASSISTANCE TO PUBLIC AGENCIES FOR POLLUTION CONTROL FACILITIES.
W71-10301 06E

POWERS OF GOVERNING BODIES.
W71-10309 06E

FINITE DIFFERENCE METHOD
FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
W71-10174 08B

PHREATIC SURFACE LOCATION AFTER DRAWDOWN,
W71-10390 08D

FINITE ELEMENT METHOD
FIELD SOLUTIONS FOR TURBULENT SEEPAGE FLOW,
W71-10394 08D

FIRE ANT CONTROL
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

FISH
AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

FISH CONSERVATION
POWERS AND DUTIES OF GAME AND FISH DEPARTMENT--POLLUTION OF WATERS.
W71-10232 06E

FISH EGGS
HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
W71-09991 05C

FISH FOOD ORGANISMS
COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

FISH HANDLING FACILITIES
SANITARY CONTROL OF SHELLFISH.
W71-10360 06E

FISH PHYSIOLOGY
EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

FISH PROTEIN CONCENTRATE
MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
W71-10206 05C

FISH TOXINS
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

FISHERIES
COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT.
W71-10284 06E

FISHKILL
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
W71-10369 05G

PROTECTION OF FISH THROUGH POLLUTION CONTROL.
W71-10445 06E

FLAT JACK METHOD
THE MEASUREMENT OF ROCK STRESS CHANGES USING HYDRAULIC BOREHOLE GAGES,
W71-10408 08E

FLEXIBLE STRUCTURES
LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
W71-10165 05G

HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

FLOATING FACILITIES
BUILDING AND OPERATING A FLOATING LABORATORY,
W71-09986 09C

FLOATS
LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
W71-10165 05G

FLOOD DAMAGE
FLOOD PLAIN INFORMATION, JAMES RIVER AND TRIBUTARIES, SPRINGFIELD, MISSOURI, PART 2.
W71-09972 04A

FLOOD PLAIN INFORMATION, SAN JACINTO RIVER (SAN JACINTO TO RAILROAD CANYON), RIVERSIDE COUNTY, CALIFORNIA.
W71-09973 04A

FLOOD FORECASTING
FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
W71-10183 04A

A STORM FLOOD HYDROGRAPH FORECAST FOR RIVERS ON THE MARITIME TERRITORY FROM RUNOFF OF REPRESENTATIVE BASINS (METODIKA PROGNOZA GIDROGRAFA DOZHDEVYKH PAVODKOV REK PRIMOR'YA NA OSNOVE UCHETA STOKA POKAZATEL'NYKH BASSEYNOV),
W71-10344 04A

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10345 04A

FLOOD RECORDS
FLOOD PLAIN INFORMATION, SAN JACINTO RIVER (SAN JACINTO TO RAILROAD CANYON), RIVERSIDE COUNTY, CALIFORNIA.
W71-09973 04A

FLOOD ROUTING
PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
W71-10180 04A

A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAYKAL BASED ON PRECIPITATION (RUSSIAN PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
W71-10181 04A

FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
W71-10183 04A

STORM FLOOD FORMATION PROCESSES (RUSSIAN PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
W71-10189 02E

A STORM FLOOD HYDROGRAPH FORECAST FOR RIVERS ON THE MARITIME TERRITORY FROM RUNOFF OF REPRESENTATIVE BASINS (METODIKA PROGNOZA GIDROGRAFA DOZHDEVYKH PAVODKOV REK PRIMOR'YA NA OSNOVE UCHETA STOKA POKAZATEL'NYKH BASSEYNOV),
W71-10344 04A

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10345 04A

FLOODING
LIABILITY FOR THE FLOODING OF MINE WASTES UPON ANOTHER'S PROPERTY.
W71-10310 06E

FLOODS
FLOOD PLAIN INFORMATION, JAMES RIVER AND TRIBUTARIES, SPRINGFIELD, MISSOURI, PART 2.
W71-09972 04A

FLOOD PLAIN INFORMATION, SAN JACINTO RIVER (SAN JACINTO TO RAILROAD CANYON), RIVERSIDE COUNTY, CALIFORNIA.
W71-09973 04A

FLOOD FLOW DOWNSTREAM FROM SLIDE,
W71-10316 02J

FLORIDA
AIA MOBILE HOME PARK, INC V BREVARD COUNTY (INJUNCTION TO PREVENT CONSTRUCTION AND OPERATION OF SEWAGE TREATMENT PLANT).
W71-10302 06E

SEADADE INDUSTRIES, INC V FLORIDA POWER AND LIGHT CO (CONDEMNING LAND PENDING APPROVAL OF FACILITY BY POLLUTION CONTROL AUTHORITIES).
W71-10303 06E

FLOW
DROP STRUCTURE FOR GERING VALLEY PROJECT, SCOTTSBLUFF COUNTY, NEBRASKA HYDRAULIC MODEL INVESTIGATION,
W71-10004 08B

FLOW AROUND OBJECTS
PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
W71-10175 08A

FLOW PROFILES
OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
W71-10018 02E

FLOW RATES
RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (RUSSIAN NEKOTORYYE REZUL'TATY LABORATORNYKH ISSLEDOVANIY SKOROSTEY DVIZHENIYA DONNYKH NANOSOV),
W71-09967 02J

THE MOVEMENT OF BOTTOM SEDIMENTS (RUSSIAN DVIZHENIYE DONNYKH NANOSOV),
W71-09969 02J

FLOW RESISTANCE
DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
W71-10177 08B

JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
W71-10178 08B

FLUID FLOW
TRANSIENTS IN PIPELINES CARRYING LIQUIDS OR GASES,
W71-10395 08B

FLUMES
RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (RUSSIAN NEKOTORYYE REZUL'TATY LABORATORNYKH ISSLEDOVANIY SKOROSTEY DVIZHENIYA DONNYKH NANOSOV),
W71-09967 02J

FOOD AND AGRICULTURE ORGANIZATION
AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

FOOD CONSUMPTION
THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
W71-10105 05C

FOOD SOURCES
THE FOOD SOURCES OF LAKE ZOOPLANKTON (IN POLISH),
W71-10094 05C

FOODS
THE FOOD SOURCES OF LAKE ZOOPLANKTON (IN POLISH),
W71-10094 05C

MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
W71-10206 05C

FORECASTING
MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
W71-09989 05C

FOUNDATION INVESTIGATIONS
THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
W71-10032 08D

FOURIER ANALYSIS

CROSS SPECTRAL ANALYSIS OF PRECIPITATION AND STREAMFLOW DATA SYSTEMS,
W71-10037 07C

STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
W71-10172 02A

FRACTURING(WELLS)
BLAST-FRACTURING,
W71-10418 08A

FREEZING
THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
W71-10048 02C

FREQUENCY ANALYSIS
DESIGN LEVELS IN THE TRANSITION ZONE BETWEEN THE TIDAL REACH AND THE RIVER REGIME REACH,
W71-10039 08B

FREQUENCY RESPONSE ANALYSIS
PROCESS CONTROL MODEL FOR OXYGEN REGENERATION OF POLLUTED RIVERS, PHASE II,
W71-10162 05G

FRESH WATER
LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS,
W71-10084 05C

FRESHWATER FISH
AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

FUNGICIDES
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

FWPCA
AGRICULTURE AS A SOURCE OF WATER POLLUTION,
W71-10375 05G

GEOCHEMISTRY
GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K GEOKHIMII ALYUMINIYA V ZONE ENERGICHNOGO GIDROLITICHESKOGO RAZLOZHENIYA ALYUMOSILIKATOV V KORAKH VYVETRIVANIYA).
W71-10341 02K

GEOLOGICAL SURVEYS
GROUND WATER RESOURCES AND DEVELOPMENT - COASTAL PLAIN REGION ERH JEN CHI--KAOHSIUNG, TAIWAN,
W71-10163 02F

GEOMORPHOLOGY
SIMULATION MODEL OF STREAM CAPTURE,
W71-10337 02E

GEOPHYSICS
ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
W71-10049 02C

GEORGIA
WATER USE CLASSIFICATIONS AND WATER QUALITY STANDARDS.
W71-10312 06E

GHYBEN-HERZBERG LENSES
OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

GLOBAL WEATHER SYSTEMS
A STATISTICAL DATA PLAN FOR BOMEX,
W71-10033 02B

GOVERNMENT FINANCE
CLEAN WATER BOND LAW OF 1970.
W71-10130 06E

POLLUTION CONTROL BONDS.
W71-10149 06E

VILLAGE SAFE WATER ACT.
W71-10226 06E

GRANTS
GRANTS FOR WATER POLLUTION CONTROL.
W71-09939 06E

AGRICULTURE AS A SOURCE OF WATER POLLUTION,
W71-10375 05G

GRANULAR MATERIALS
TECHNIQUE FOR STUDY OF GRANULAR MATERIALS,
W71-10405 08D

GRAVELS
VARIATION OF SPECIFIC RETENTION IN RUBBLY ROCK PARTICLES,
W71-10019 02F

GRAVIMETRY
ESTIMATING STORAGE CAPACITY IN DEEP ALLUVIUM BY GRAVITY-SEISMIC METHODS,
W71-10384 02F

GREAT LAKES
A DYNAMIC PROGRAMMING ALGORITHM FOR THE OPERATION OF THE GREAT LAKES,
W71-10076 06B

ORGANIC CARBON AND NITROGEN IN THE SURFACE SEDIMENTS OF LAKES ONTARIO, ERIE, AND HURON,
W71-10327 05A

GREAT LAKES REGION
INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
W71-09945 04A

ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
W71-10026 03B

GREAT PLAINS IRRIGATION DISTRICT
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

GROUNDWATER
HYDROGEOLOGY OF THE USSR VOLUME 34, THE KARAGANDA OBLAST (RUSSIAN GIDROGEOLOGIYA SSSR TOM XXXIV, KARAGANDINSKAYA OBLAST),
W71-09963 02F

GROUND WATER RESOURCES AND DEVELOPMENT - COASTAL PLAIN REGION ERH JEN CHI--KAOHSIUNG, TAIWAN,
W71-10163 02F

TWO STAGES IN THE FORMATION OF ICE-LENSES ON FROZEN RIVERS (O DVUKH STADIYAKH FORMIROVANIYA LINZ V MERZLOM GRUNTE PRI PROMERZANII REK),
W71-10350 02C

AVERAGE WATER TABLE DECLINE.
W71-10417 04B

RESEARCH IS GUIDE FOR ESTIMATING WELL COSTS.
W71-10424 08A

POLLUTION OF UNDERGROUND WATER.
W71-10446 06E

GROUNDWATER BASINS
GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN - THE GREAT BASIN, U.S.A.,
W71-10052 02F

ESTIMATING STORAGE CAPACITY IN DEEP ALLUVIUM BY GRAVITY-SEISMIC METHODS,
W71-10384 02F

GROUNDWATER MINING
AQUIFER MODEL RESEARCH REVIEWED.
W71-10416 02F

AVERAGE WATER TABLE DECLINE.
W71-10417 04B

GROUNDWATER MOVEMENT
OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH - INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
W71-10318 02F

GROUNDWATER RECHARGE
VERTICAL RECHARGE OF UNCONFINED AQUIFER,
W71-10176 02G

TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

HARBORS
SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN - HYDRAULIC MODEL INVESTIGATION,
W71-10008 08B

W71-10009 08B

REGULATION OF COMMERCIAL SHIPPING IN HARBORS TO CONTROL WATER POLLUTION.
W71-10305 06E

HATCHERY WASTE DISPOSAL
DISPOSAL OF HATCHERY WASTES,
W71-10364 05D

HATCHING
HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
W71-09991 05C

HAWAII
ADMINISTRATION OF POLLUTED WATERS,
W71-10253 06E

ENVIRONMENTAL QUALITY CONTROL.
W71-10289 06E

WATER POLLUTION CONTROL.

W71-10298 06E

WATER QUALITY STANDARDS.
W71-10299 06E

REGULATION OF COMMERCIAL SHIPPING IN HARBORS TO CONTROL WATER POLLUTION.
W71-10305 06E

FURNISHING POTABLE WATER.
W71-10435 06E

HAZARDOUS MATERIALS
ATLANTA COASTAL REGION, MULTI AGENCY OIL AND HAZARDOUS MATERIALS, POLLUTION CONTINGENCY PLAN, REGION IV.
W71-10200 05G

HEAT BALANCE
THERMAL INTERACTION OF THE ATMOSPHERE AND THE HYDROSPHERE IN THE ARTIC (RUSSIAN TEPLOVOYE VZAIMODEYSTVIYE ATMOSFERY I GIDROSFERY V ARKTIKE),
W71-09962 02C

TOTAL EVAPORATION IN THE AMUR OBLAST AND MARITIME TERRITORY DURING SUMMER MONTHS (RUSSIAN SUMMARNOYE ISPARENIYE ZA LETNIYE MESYATSY V AMURSKO-PRIMORSKOY OBLASTI),
W71-10187 02D

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I VLAGI),
W71-10188 02D

HEAT FLOW TO MELTING ICE ON THE USSURI RIVER (TEPLOPRIKHOD K TAYUSHCHEMU L'DU REKI USSURI),
W71-10349 02C

HEAT FLOW
HEAT FLOW TO MELTING ICE ON THE USSURI RIVER (TEPLOPRIKHOD K TAYUSHCHEMU L'DU REKI USSURI),
W71-10349 02C

HEAT RESISTANCE
EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

HEAT TRANSFER
VTE PILOT PLANT ANNUAL REPORT FOR THE PERIOD ENDING JULY 1, 1968,
W71-09976 03A

HEAVY METAL TOXICITY
METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

HEAVY METALS
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

OHIO V WYANDOTTE CHEMICALS CORP (SUPREME COURT DECLINES ORIGINAL JURISDICTION OVER WATER POLLUTION COMPLAINT BY STATE),
W71-10153 06E

MERCURY IN WATER - A BIBLIOGRAPHY.
W71-10191 05B

MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
W71-10206 05C

TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

HEPTACHLOR
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER FLOUNDER, PSEUDO-PLEURONECTES AMERICANUS, FROM THE WEWEANTIC RIVER ESTUARY, MASSACHUSETTS,
W71-10212 05C

HEPTACHLOR EPOXIDE
CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER FLOUNDER, PSEUDO-PLEURONECTES AMERICANUS, FROM THE WEWEANTIC RIVER ESTUARY, MASSACHUSETTS,
W71-10212 05C

HIGH PLAINS
AVERAGE WATER TABLE DECLINE.
W71-10417 04B

HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
W71-10413 04B

HIGHWAY EFFECTS
IMPLEMENTATION OF NATIONAL ENVIRONMENTAL POLICY.
W71-10285 06E

HOT SPRINGS
BIMODAL DISTRIBUTION OF PH VALUES OF THERMAL SPRINGS OF THE WORLD.
W71-10339 02K

HUMAN PATHOLOGY
MERCURY POLLUTION INTEREST IN IT NOW ON THE UPSWING,
W71-10088 05C

HURRICANES
EFFECTS OF HURRICANE BARRIER ON NAVIGATION CONDITIONS IN EAST PASSAGE, NARRAGANSETT BAY, RHODE ISLAND HYDRAULIC MODEL INVESTIGATION,
W71-10000 08B

HYALOCHLORELLA MARINE
THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
W71-10090 05C

HYDRATES
NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
W71-09974 01B

HYDRAULIC MODELS
OUTLET STRUCTURE FOR EAU GALLE RESERVOIR, EAU GALLE RIVER, WISCONSIN, HYDRAULIC MODEL INVESTIGATION,
W71-09998 08B

NAVIGATION CONDITIONS AT MILLERS FERRY LOCK AND DAM, ALABAMA RIVER, ALABAMA. HYDRAULIC MODEL INVESTIGATION,
W71-09999 08B

EFFECTS OF HURRICANE BARRIER ON NAVIGATION CONDITIONS IN EAST PASSAGE, NARRAGANSETT BAY, RHODE ISLAND HYDRAULIC MODEL INVESTIGATION,
W71-10000 08B

MODERNIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY HYDRAULIC MODEL INVESTIGATION,
W71-10001 08B

CONTROL STRUCTURE, LITTLE SIOUX RIVER, IOWA, HYDRAULIC MODEL INVESTIGATION,
W71-10002 08B

MAGIC ISLAND COMPLEX, INCLUDING KEWALO BASIN AND AIA WAI BOAT HARBOR, HONOLULU, OAHU, HAWAII. HYDRAULIC MODEL INVESTIGATION,
W71-10003 08B

DROP STRUCTURE FOR GERING VALLEY PROJECT, SCOTTSBLUFF COUNTY, NEBRASKA HYDRAULIC MODEL INVESTIGATION,
W71-10004 08B

NAVIGATION CONDITIONS AT MCALPINE LOCKS AND DAM, OHIO RIVER. HYDRAULIC MODEL INVESTIGATION,
W71-10005 08B

NAVIGATION CONDITIONS AT COLUMBIA LOCK AND DAM, OUACHITA RIVER LOUISANA,
W71-10006 08B

STABILITY OF PROPOSED BREAKWATER, BURNS WATERWAY HARBOR, INDIANA HYDRAULIC MODEL INVESTIGATION,
W71-10007 08B

SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN HYDRAULIC MODEL INVESTIGATION,
W71-10008 08B

W71-10009 08B

A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 08B

STUDIES OF THE DISPOSITION OF PARTIAL DISCHARGES OF BED LOAD UPSTREAM OF THE SULINA MOUTH (FRENCH ETUDES DES DISPOSITIFS DE DECHARGEMENT PARTIEL DU DEBIT SOLIDE EN AMONT DE L'EMBOUCHURE DE SULINA),
W71-10060 08B

RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
W71-10061 08B

MODEL STUDY OF POWER INTAKE GATE OF MOSSYROCK DAM,
W71-10168 08C

WIND-INDUCED CIRCULATION IN SHALLOW WATER,
W71-10170 02E

PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCCUR,
W71-10175 08A

DESIGNS FOR RUBBLE -MOUND BREAKWATERS, DANA POINT HARBOR, CALIFORNIA,
W71-10199 08B

POWER LOSSES AND FLOW TOPOLOGIES IN CONVERGING MANIFOLD,
W71-10397 08B

HYDRAULIC SYSTEMS
OUTLET STRUCTURE FOR EAU GALLE RESERVOIR, EAU GALLE RIVER, WISCONSIN, HYDRAULIC MODEL INVESTIGATION,
W71-09998 08B

MODERNIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY HYDRAULIC MODEL INVESTIGATION,
W71-10001 08B

HYDRAULIC VALVES
CAVITATION PARAMETERS FOR OUTLET VALVES,
W71-10379 08B

HYDRAULICS
THE MOVEMENT OF BOTTOM SEDIMENTS (RUSSIAN DVIZHENIYE DONNYKH NANOSOV),
W71-09969 02J

CERTAIN ASPECTS OF THE INFLUENCE ON THE HYDROLOGIC REGIME OF HYDRAULIC WORKS FOR THE IMPROVEMENT OF NAVIGATION IN THE DANUBE DELTA (FRENCH CERTAINS APSECTS DE L'INFLUENCE SUR LE REGIME HYDROLOGIQUE DES TRAVAUX HYDRAULIQUES EFFECTUES POUR L'AMELIORATION DE LA NAVIGATION DANS LE DELTA DU DANUBE),
W71-10058 08B

RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
W71-10061 08B

POWER LOSSES AND FLOW TOPOLOGIES IN CONVERGING MANIFOLD,
W71-10397 08B

HYDROGEN ION CONCENTRATION
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

HYDROGEOLOGY
HYDROGEOLOGY OF THE USSR VOLUME 34, THE KARAGANDA OBLAST (RUSSIAN GIDROGEOLOGIYA SSSR TOM XXXIV, KARAGANDINSKAYA OBLAST),
W71-09963 02F

HYDROLOGICAL MAPPING AND THE IHD,
W71-10030 07C

HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
W71-10050 02L

REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
W71-10051 02F

GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN THE GREAT BASIN, U.S.A.,
W71-10052 02F

THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
W71-10053 02F

INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (IZMENCHIVOST' VNUTRIGODOVOGO RASPREDELENIYA STOKA REK VOSTOCHNOGO ZAKAVKAZ'YA),
W71-10354 02E

HYDROGRAPH ANALYSIS
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10014 02A

PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
W71-10180 04A

FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
W71-10183 04A

A STORM FLOOD HYDROGRAPH FORECAST FOR RIVERS ON THE MARITIME TERRITORY FROM RUNOFF OF REPRESENTATIVE BASINS (METODIKA PROGNOZA GIDROGRAFA DOZHDEVYKH PAVODKOV REK PRIMOR'YA NA OSNOVE UCHETA STOKA POKAZATEL'NYKH BASSEYNOV),
W71-10344 04A

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10385 04A

HYDROGRAPHS
A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAYKAL BASED ON PRECIPITATION (RUSSIAN PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
W71-10181 04A

IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (IDENTIFIKATSIYA NELINEYNYKH GIDROLOGICHESKIKH SISTEM),
W71-10342 02E

HYDROLOGIC ASPECTS
DYNAMICS OF THE ILI RIVER DELTA (RUSSIAN DINAMIKA DEL'TY REKI ILI),
W71-09970 02J

HYDROLOGIC BUDGET
COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
W71-10021 02A

HYDROLOGIC CYCLE
PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
W71-10180 04A

A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
W71-10185 02E

TOTAL EVAPORATION IN THE AMUR OBLAST AND MARITIME TERRITORY DURING SUMMER MONTHS (RUSSIAN SUMMARNOYE ISPARENIYE ZA LETNIYE MESYATSY V AMURSKO-PRIMORSKOY OBLASTI),
W71-10187 02D

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I YLAGI),
W71-10188 02D

STORM FLOOD FORMATION PROCESSES (RUSSIAN PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
W71-10189 02E

HYDROLOGIC DATA
SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
W71-09946 05B

CALCULATION OF THE MEAN ANNUAL DISCHARGE OF SUSPENDED SEDIMENTS AND ITS CYCLIC FLUCTUATIONS (RUSSIAN OPREDELENIYE NORMY I TSIKLICHESKIKH KOLEBANIY GODOVOGO STOKA VZVESHENNYKH NANOSOV),
W71-09964 02J

OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
W71-10413 04B

AVERAGE WATER TABLE DECLINE.
W71-10417 04B

HYDROLOGICAL MAPPING
HYDROLOGICAL MAPPING AND THE IHD,
W71-10030 07C

HYDROLYSIS
GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K GEOKHIMII ALYUMINIYA V ZONE ENERGICHNOGO GIDROLITICHESKOGO RAZLOZHENIYA ALYUMOSILIKATOV V KORAKH VYVETRIVANIYA).
W71-10341 02K

HYDROMETERS
SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
W71-10332 02J

HYDROPHOTOMETERS
SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
W71-10332 02J

ICE BREAKUP
THE LAWS OF ICE PROCESSES IN DELTAS,
W71-10042 02C

THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
W71-10048 02C

ICE JAMS
THE LAWS OF ICE PROCESSES IN DELTAS,
W71-10042 02C

THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
W71-10048 02C

ICE-WATER INTERFACES
THERMAL INTERACTION OF THE ATMOSPHERE AND THE HYDROSPHERE IN THE ARTIC (RUSSIAN TEPLOVOYE VZAIMODEYSTVIYE ATMOSFERY I GIDROSFERY V ARKTIKE),
W71-09962 02C

HEAT FLOW TO MELTING ICE ON THE USSURI RIVER (TEPLOPRIKHOD K TAYUSHCHEMU L'DU REKI USSURI),
W71-10349 02C

TWO STAGES IN THE FORMATION OF ICE-LENSES ON FROZEN RIVERS (O DVUKH STADIYAKH FORMIROVANIYA NALEDEY NA PROMERZAYUSHCHIKH REKAKH),
W71-10350 02C

IDAHO
DOMESTIC WATER AND ICE.
W71-09979 06E

POLLUTION OF IRRIGATION WORKS, WATER SUPPLIES, AND WATER COURSES.
W71-09983 06E

WATER POLLUTION ABATEMENT,
W71-10252 06E

PROTECTION OF FISH THROUGH POLLUTION CONTROL.
W71-10445 06E

IGNEOUS ROCK DRILLING
BEST WELL DEPTH IN CRYSTALLINE ROCKS,
W71-10420 08A

ILLINOIS
EXISTING LEVELS OF NITRATES IN WATERS - THE ILLINOIS SITUATION,
W71-09956 05A

THE HEALTH EFFECTS OF NITRATES IN WATER (PANEL DISCUSSION),
W71-09957 05B

DRAINAGE DISTRICTS--POLLUTION CONTROL.
W71-10151 06E

ADOPTION OF ORDINANCES BY SANITARY DISTRICTS,
W71-10152 06E

CITY OF HIGHLAND V AUER (CITY'S LIABILITY FOR PERMITTING RESIDENTS TO POLLUTE ITS SEWERS).
W71-10198 06E

CITY OF SPRINGFIELD V NORTH FORK OUTLET DRAINAGE DIST (PREVENTING DRAINAGE DISTRICT FROM STRAIGHTENING RIVER).
W71-10203 06E

COOK V CITY OF DU QUOIN (CITY'S LIABILITY FOR POLLUTION OF STREAM).
W71-10204 06E

ENVIRONMENTAL CONTROL ACT.
W71-10280 06E

CHICAGO SANITARY DISTRICT--POLLUTION CONTROL.
W71-10281 06E

RIVER CONSERVANCY DISTRICTS--POLLUTION CONTROL.
W71-10282 06E

INCOME
PLANNING ANALYSIS FOR THE NON-MARKET VALUES OF WATER RESOURCES WITH PARTICULAR EMPHASIS ON RECREATION,
W71-09944 06B

INDEXING
COPPER IN WATER - A BIBLIOGRAPHY.
W71-10193 05B

MANGANESE IN WATER - A BIBLIOGRAPHY.
W71-10194 05B

MAGNESIUM IN WATER - A BIBLIOGRAPHY.
W71-10195 05B

INDIA
A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
W71-10015 02B

ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
W71-10040 02E

INDIANA
WATER QUALITY STANDARDS FOR WATERS OF INDIANA.
W71-10119 05G

INDUCED INFILTRATION
HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
W71-10050 02L

INDUSTRIAL WASTES
WASTE TREATMENT FACILITIES.
W71-10239 06E

INFILTRATION
A RUNOFF POTENTIAL RATING TABLE FOR SOILS,
W71-10016 02G

SOIL CHEMICAL CHANGES AND INFILTRATION RATE REDUCTION UNDER SEWAGE SPREADING,
W71-10108 05B

VERTICAL RECHARGE OF UNCONFINED AQUIFER,
W71-10176 02G

INFLOW
CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN K RASCHETU VODNOGO BALANSA OZ. KHANKA),
W71-10186 02H

A SHORT-TERM FORECAST OF INFLOW TO THE RESERVOIR OF THE ZEYSKAYA HYDROELECTRIC POWER PLANT (KRATKOSROCHNYY PROGNOZ PRITOCHNOSTI V VODOKHRANILISHCHE ZEYSKOY GES),
W71-10347 04A

INFRARED IDENTIFICATION
THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

INFRARED RADIATION
THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

INFRARED SPECTROSCOPY
'POLYWATER' AND SWEAT SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

INHIBITION
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

INHIBITORS
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

INJECTION WELLS
INJECTION WELL ACT.
W71-10229 06E

POLLUTION AND ATTENDANT PROBLEMS,
W71-10261 05G

INLAND WATERWAYS
CONTROL STRUCTURE, LITTLE SIOUX RIVER, IOWA, HYDRAULIC MODEL INVESTIGATION,
W71-10002 08B

DROP STRUCTURE FOR GERING VALLEY PROJECT, SCOTTSBLUFF COUNTY, NEBRASKA HYDRAULIC MODEL INVESTIGATION,
W71-10004 08B

INPUT-OUTPUT ANALYSIS
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10014 02A

INSECTICIDES
LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS,
W71-10084 05C

PRIMARY PRODUCTION DEPRESSION OF OXIGEN EVOLUTION IN ALGAL CULTURES BY ORGANOPHOSPHORUS INSECTICIDES,
W71-10096 05C

INSECTS
BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

INSTITUTIONAL ASPECTS
ATLANTA COASTAL REGION, MULTI AGENCY OIL AND HAZARDOUS MATERIALS, POLLUTION CONTINGENCY PLAN, REGION IV.
W71-10200 05G

INSTRUMENTATION
METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
W71-10045 02L

DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
W71-10072 07B

INSULATING OIL
AGING OF OIL-FILLED CABLE DIELECTRICS,
W71-10404 08C

INTAKES
MODEL STUDY OF POWER INTAKE GATE OF MOSSYROCK DAM,
W71-10168 08C

INTERNATIONAL HYDROLOGICAL DECADE
HYDROLOGICAL MAPPING AND THE IHD,
W71-10030 07C

INTERSTATE COMMISSIONS
KLAMATH RIVER BASIN COMPACT.
W71-10439 06E

INTERSTATE COMPACTS
KLAMATH RIVER BASIN COMPACT.
W71-10439 06E

INTERSTATE RIVERS
WATER QUALITY STANDARDS FOR INTERSTATE WATERS,
W71-10160 05G

INTTAKE GATES
MODEL STUDY OF POWER INTAKE GATE OF MOSSYROCK DAM,
W71-10168 08C

INVESTIGATIONS
SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
W71-10028 02A

ION EXCHANGE
QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
W71-09936 05B

TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
W71-09961 05B

IONS
REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
W71-09987 05C

HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
W71-09991 05C

IRRIGATION
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

IRRIGATION EFFICIENCY
QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,

W71-09936 05B

PAHRUMP FIELD LABORATORY,
W71-10418 03F

IRRIGATION ENGINEERING
BASIC EQUIPMENT IN AUTOMATIC DELIVERY SYSTEMS,
W71-10389 03F

IRRIGATION RETURN FLOW
QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
W71-09936 05B

IRRIGATION SYSTEMS
AUTOMATION FOR SMALL IRRIGATION PROJECTS,
W71-10391 03F

ISLANDS
MAGIC ISLAND COMPLEX, INCLUDING KEWALO BASIN AND ALA WAI BOAT HARBOR, HONOLULU, OAHU, HAWAII. HYDRAULIC MODEL INVESTIGATION,
W71-10003 08B

JETS
DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL(FRENCH DONNEES SUR LES CHARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

SURFACE DISTURBANCE FROM SUBMERGED JET,
W71-10171 08B

JOINTS(CONNECTIONS)
JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
W71-10178 08B

KANSAS
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

WATER SUPPLY AND SEWAGE.
W71-10248 06E

WATER POLLUTION CONTROL (CONSTRUCTION GRANTS FOR POLLUTION CONTROL FACILITIES).
W71-10251 06E

REGULATION OF OIL AND GAS WELLS.
W71-10440 06E

DISPOSAL OF BRINES AND MINERALIZED WATERS.
W71-10441 06E

KAOLIN
PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,
W71-10207 05C

KAOLINITE
PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,
W71-10207 05C

KARAGANDA OBLAST
HYDROGEOLOGY OF THE USSR VOLUME 34, THE KARAGANDA OBLAST (RUSSIAN GIDROGEOLOGIYA SSSR TOM XXXIV, KARAGANDINSKAYA OBLAST),
W71-09963 02F

KARST
EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (VLIYANIYE EROZIONNOGO VREZA RECHNYKH DOLIN NA RAZVITIYE KARSTA),
W71-10353 02J

KAZAKHSTAN
HYDROGEOLOGY OF THE USSR VOLUME 34, THE KARAGANDA OBLAST (RUSSIAN GIDROGEOLOGIYA SSSR TOM XXXIV, KARAGANDINSKAYA OBLAST),
W71-09963 02F

THE MOVEMENT OF BOTTOM SEDIMENTS (RUSSIAN DVIZHENIYE DONNYKH NANOSOV),
W71-09969 02J

DYNAMICS OF THE ILI RIVER DELTA (RUSSIAN DINAMIKA DEL'TY REKI ILI),
W71-09970 02J

KENTUCKY
WATER QUALITY STANDARDS FOR INTERSTATE WATERS,
W71-10160 05G

POLLUTION FROM BOATS AND VESSELS,
W71-10161 05G

BY-PASSING OF SEWAGE, INDUSTRIAL, AND OTHER WASTE TREATMENT PLANTS AND EMERGENCY, ACCIDENTAL, OR OTHER EXCESSIVE SPILLS AND DISCHARGES OF SEWAGE, INDUSTRIAL OR OTHER WASTES.
W71-10167 05G

PERMITS TO DISCHARGE SEWAGE, INDUSTRIAL WASTES OR OTHER WASTES.
W71-10273 06E

KHABAROVSK TERRITORY
ABSENCE OF DOWNSTREAM TRANSPORT OF ALLUVIUM BY DOWNCUTTING RIVERS, AS ILLUSTRATED BY THE GAR' RIVER (OTSUTSTVIYE PRODOL'NOGO PERENOSA ALLYUVIYA VREZAYUSHCHEYSYA REKI NA PRIMERE R. GAR'),
W71-10352 02J

KINEMATIC WAVES
ESTIMATION OF SURFACE WTER LAG TIME FROM THE KINEMATIC WAVE EQUATIONS,
W71-10022 02E

KIRGHIZ SSR
RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (RUSSIAN NEKOTORYYE REZUL'TATY LABORATORNYKH ISSLEDOVANIY SKOROSTEY DVIZHENIYA DONNYKJ NANOSOV),
W71-09967 02J

KRASNODAR KRAY
PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (RUSSIAN FOTOGRAFICHESKIY METOD GRANULOMETRICHESKOGO ANALIZA KRUPNYKH NANOSOV),
W71-09966 02J

LABORATORIES
BUILDING AND OPERATING A FLOATING LABORATORY,
W71-09986 09C

LABORATORY TESTS
IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
W71-09995 05A

LAKE BAYKAL
PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (RUSSIAN FOTOGRAFICHESKIY METOD GRANULOMETRICHESKOGO ANALIZA KRUPNYKH NANOSOV),
W71-09966 02J

LAKE BONNEVILLE
GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN THE GREAT BASIN, U.S.A.,
W71-10052 02F

LAKE MANAGEMENT
INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
W71-09945 04A

LAKES
INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
W71-09945 04A

ATOMIC ABSORPTION DETERMINATION OF MICROGRAM QUANTITIES OF MOLYBDENUM IN LAKE WATERS,
W71-10077 07B

A REVIEW OF STUDIES ON THE BOTTOM SEDIMENTS OF LAKES (IN POLISH),
W71-10095 05C

WIND-INDUCED CIRCULATION IN SHALLOW WATER,
W71-10170 02E

CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN K RASCHETU VODNOGO BALANSA OZ. KHANKA),
W71-10186 02H

LAMINAR FLOW
JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
W71-10178 08B

LAND TENURE
LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

LAND USE
MANAGEMENT OF ANIMAL FEEDLOT WASTES -- LAND SPREADING AS A DISPOSAL PROCESS,
W71-10370 05G

LAND VALUE
LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

LANDSLIDES
FLOOD FLOW DOWNSTREAM FROM SLIDE,
W71-10316 02J

STREAM BANK FAILURE AND ROTATIONAL SLUMPING PRESERVATION AND SIGNIFICANCE IN THE GEOLOGIC RECORD,
W71-10338 02J

PUGET PEAK AVALANCHE, ALASKA.
W71-10335 02J

LATERITES
THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
W71-10031 02G

LAW OF THE SEA
POLLUTION OF THE HIGH SEAS RESULTING FROM DRILLING AND PRODUCING OPERATIONS--FEDERAL JURISDICTION AND OPERATOR LIABILITY,
W71-10112 05G

LEACHING
THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
W71-10031 02G

TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A

RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

LEGAL ASPECTS
STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
W71-10103 05C

CONCERNING WATER POLLUTION, AND PROVIDING PENALTIES FOR VIOLATIONS RELATING TO POLLUTION OF STATE WATERS.
W71-10295 06E

REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
W71-10369 05G

LEGAL PROCEDURE
STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
W71-10103 05C

LEGISLATION
WATER POLLUTION CONTROL ACT.
W71-10068 06E

WATER POLLUTION CONTROL LAWS.
W71-10117 05G

OCEAN POLLUTION MESSAGE,
W71-10132 06E

SPECIAL TAX WRITE-OFF FOR POLLUTION CONTROL DEVICES.
W71-10139 06E

ADOPTION OF ORDINANCES BY SANITARY DISTRICTS,
W71-10152 06E

GULF COAST WASTE DISPOSAL AUTHORITY (STATE POLLUTION CONTROL BY REGIONAL AGENCY).
W71-10231 06E

PROHIBITION AGAINST DUMPING WASTE MATERIAL IN WATERWAYS.
W71-10234 06E

ENVIRONMENT REPORT--BILLS TO AUTHORIZE CLASS ACTIONS RECOGNIZE RIGHT TO CLEAN ENVIRONMENT,
W71-10274 06E

REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
W71-10369 05G

AGRICULTURE AS A SOURCE OF WATER POLLUTION,
W71-10375 05G

POLLUTING WATER.
W71-10449 06E

LETHAL LIMIT
MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
W71-09989 05C

LIABILITY
STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
W71-10103 05C

LIGHT INTENSITY
A SIMPLE, SENSITIVE UNDERWATER PHOTOMETER,
W71-10089 07B

LIMIT ANALYSIS
LIMIT ANALYSIS OF STABILITY OF SLOPES,
W71-10393 08D

LINEAR PROGRAMMING
THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
W71-10020 02A

IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (IDENTIFIKATSIYA NELINEYNYKH GIDROLOGICHESKIKH SISTEM),
W71-10342 02E

LINEARITY(MATHEMATICAL)
THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
W71-10020 02A

LIQUID WASTES
CATTLE FEEDLOT WATER QUALITY HYDROLOGY,
W71-10373 05G

LIVESTOCK WASTES
ANIMAL WASTES--A MAJOR POLLUTION PROBLEM,
W71-10368 05G

LOCAL GOVERNMENTS
A1A MOBILE HOME PARK, INC V BREVARD COUNTY (INJUNCTION TO PREVENT CONSTRUCTION AND OPERATION OF SEWAGE TREATMENT PLANT).
W71-10302 06E

LOCKS
NAVIGATION CONDITIONS AT MILLERS FERRY LOCK AND DAM, ALABAMA RIVER, ALABAMA. HYDRAULIC MODEL INVESTIGATION,
W71-09999 08B

MODERNIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY HYDRAULIC MODEL INVESTIGATION,
W71-10001 08B

NAVIGATION CONDITIONS AT COLUMBIA LOCK AND DAM, QUACHITA RIVER LOUISANA,
W71-10006 08B

LOGGING OF CASED WELLS
ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
W71-10428 03B

LOGGING(RECORDING)
TEMPERATURE SURVEYS THE ART OF INTERPRETATION,
W71-10427 03B

ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
W71-10428 03B

LONGTIME TESTS
LONG-TIME DURABILITY OF CONCRETE IN SEAWATER,
W71-10380 08F

LOUISIANA
SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
W71-09946 05B

WHITE V EDGERLY PETROLEUM CO (POLLUTION OF RICE CROP BY SALINE WATER FROM OIL WELL).
W71-10205 06E

LOW MERCURY CONCENTRATIONS
DIGESTION OF OYSTERS FOR THE DETERMINATION OF MERCURY,
W71-10092 05A

LYSIMETERS
COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
W71-10021 02A

SOIL CHEMICAL CHANGES AND INFILTRATION RATE REDUCTION UNDER SEWAGE SPREADING,
W71-10108 05B

MACKENZIE DELTA(CANADA)
THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
W71-10048 02C

ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
W71-10049 02C

MAGNESIUM
MAGNESIUM IN WATER - A BIBLIOGRAPHY.
W71-10195 05B

MALAYA
THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
W71-10032 08D

MALAYSIA
THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
W71-10031 02G

MALODOR
AIR POLLUTION FROM ANIMAL WASTES,
W71-10101 05A

MANAGEMENT
MANAGEMENT OF ANIMAL FEEDLOT WASTES -- LAND SPREADING AS A DISPOSAL PROCESS,
W71-10370 05G

MANGANESE
MANGANESE IN WATER - A BIBLIOGRAPHY.
W71-10194 05B

MANIFOLDS
POWER LOSSES AND FLOW TOPOLOGIES IN CONVERGING MANIFOLD,
W71-10397 08B

MAPPING
HYDROLOGICAL MAPPING AND THE IHD,
W71-10030 07C

MAPS
NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,
W71-10010 07C

HYDROLOGICAL MAPPING AND THE IHD,
W71-10030 07C

MARINE ALGAE
A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
W71-10066 05C

MARINE PLANTS
DISSOLVED ORGANIC PHOSPHORUS EXCRETION BY MARINE PHYTOPLANKTON,
W71-10083 05C

MARITIME TERRITORY
PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
W71-10180 04A

FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV

S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
W71-10183 04A

CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN K RASCHETU VODNOGO BALANSA OZ. KHANKA),
W71-10186 02H

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10345 04A

CALCULATING PRECIPITATION IN WATER BALANCE ESTIMATES (UCHET OSADKOV PRI VODNOBALANSOVYKH RASCHETAKH).
W71-10346 02B

MARKOV PROCESSES
PARAMETER ESTIMATION FOR WET-DAY SEQUENCES,
W71-10023 02B

MARL LAKES
DISSOLVED ORGANIC MATTER AND PHYTOPLANKTONIC PRODUCTIVITY IN MARL LAKES,
W71-10079 05C

MARYLAND
STATUS OF WATER QUALITY AND SIGNIFICANT SOURCES OF WASTE WATER DISCHARGES IN MARYLAND.
W71-10254 05G

REGULATIONS ON POLLUTION ABATEMENT.
W71-10304 06E

MASSACHUSETTS
RULES FOR THE PREVENTION AND CONTROL OF OIL POLLUTION IN THE WATERS OF THE COMMONWEALTH.
W71-10115 05G

MATHEMATICAL MODELS
THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
W71-10020 02A

COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
W71-10021 02A

ESTIMATION OF SRUFACE WTER LAG TIME FROM THE KINEMATIC WAVE EQUATIONS,
W71-10022 02E

PARAMETER ESTIMATION FOR AQUIFER EVALUATION,
W71-10024 02F

PARAMETER ESTIMATION IN HYDROLOGY THE STATE OF THE ART,
W71-10025 02F

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

WATER QUALITY MODELING OF ESTUARIES,
W71-10047 05G

WIND-INDUCED CIRCULATION IN SHALLOW WATER,
W71-10170 02E

FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
W71-10174 08B

HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
W71-10179 03B

TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
W71-10326 05B

MATHEMATICAL STUDIES
OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
W71-10018 02E

VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (IZMENCHIVOST' VNUTRIGODOVOGO RASPREDELENIYA STOKA REK VOSTOCHNOGO ZAKAVKAZ'YA),
W71-10354 02E

MEANDERS
TENTATIVE LABORATORY INVESTIGATION OF DIVAGATING-RIVER BANK DESTRUCTION (RUSSIAN OPYT ISSLEDOVANIYA V LABORATORNYKH USLOVIYAKH RAZRUSHENIYA BEREGOV (DEYGISHA) NA BLUZHDAYUSHCHIKH REKAKH),
W71-09971 02J

MEASUREMENT
TOTAL EVAPORATION IN THE AMUR OBLAST AND MARITIME TERRITORY DURING SUMMER MONTHS (RUSSIAN SUMMARNOYE ISPARENIYE ZA LETNIYE MESYATSY V AMURSKO-PRIMORSKOY OBLASTI),
W71-10187 02D

OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
W71-10413 04B

MEDUSAE
TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

MEMBRANE PROCESSES
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

MEMBRANES
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

MERCURY
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

MERCURY POLLUTION INTEREST IN IT NOW ON THE UPSWING,
W71-10088 05C

DIGESTION OF OYSTERS FOR THE DETERMINATION OF MERCURY,
W71-10092 05A

MERCURY IN WATER - A BIBLIOGRAPHY.
W71-10191 05B

MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
W71-10206 05C

MERCURY COMPOUNDS
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

METABOLIC PATHWAYS
IDENTIFICATION OF METABOLITES OF N - (1, 1-DIMETHYLPROPYNYL) - 3,5 DICHLORBENZAMINE IN RAT AND COW URINE AND RAT FECES,
W71-10356 05A

METALS
REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
W71-09987 05C

TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

METAMORPHIC ROCK DRILLING
BEST WELL DEPTH IN CRYSTALLINE ROCKS,
W71-10420 08A

METEOROLOGICAL DATA
RECURRING TEXAS DROUGHTS,
W71-10410 07C

METEOROLOGY
ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
W71-10026 03B

METHEMOGLOBIN
CONTRIBUTION OF FERTILIZERS TO WATER POLLUTION,
W71-10372 05G

METHOD OF CHARACTERISTICS
TRANSIENTS IN PIPELINES CARRYING LIQUIDS OR GASES,
W71-10395 08B

MICHIGAN
THE CONTRIBUTION OF URBAN AND AGRICULTURAL PESTICIDE USE TO THE CONTAMINATION OF THE RED CEDAR RIVER,
W71-10035 05B

INTERRELATIONS OF SEVERAL ABIOTIC FACTORS AND THE HIGHER AQUATIC PLANTS IN A STREAM ECOSYSTEM,
W71-10036 05C

MICROBIAL FLOC
ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

MIGRATION ROUTES
COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

MINE DRAINAGE
MINE DRAINAGE.
W71-10277 06E

MINERAL WATER
BIMODAL DISTRIBUTION OF PH VALUES OF THERMAL SPRINGS OF THE WORLD.
W71-10339 02K

MINING
POLLUTION OF AQUATIC HABITATS.
W71-10081 06E

LIABILITY FOR THE FLOODING OF MINE WASTES UPON ANOTHER'S PROPERTY.
W71-10310 06E

MINING INDUSTRY
WELL TECHNOLOGY SERVES THE MINING INDUSTRY.
W71-10423 04B

MINNESOTA
AUTO CLUB OF ST PAUL V CITY OF WHITE BEAR LAKE (RIGHT OF CITY TO CONSTRUCT SEWAGE OUTLET INTO LAKE).
W71-10311 06E

MISSISSIPPI

WATER QUALITY CRITERIA FOR INTRASTATE WATERS.
W71-10267 06E

MISSOURI
FLOOD PLAIN INFORMATION, JAMES RIVER AND TRIBUTARIES, SPRINGFIELD, MISSOURI, PART 2.
W71-09972 04A

MISSOURI RIVER BASIN WATER QUALITY STANDARDS.
W71-10113 05G

OPEN PUBLIC HEARING TO DETERMINE WATER QUALITY STANDARDS,
W71-10156 06E

REGULATIONS FOR PREVENTION OF POLLUTION OF SUBSURFACE WATERS OF THE STATE,
W71-10157 05G

MARINE TOILET REGULATIONS,
W71-10158 05G

REGULATIONS FOR TURBID WATER DISCHARGES AND TO PREVENT INTERMITTENT OR ACCIDENTAL POLLUTION OF WATERS OF THE STATE,
W71-10159 05G

MISSOURI WATER PLAN, STATE LAWS, POLICIES AND PROGRAMS PERTAINING TO WATER AND RELATED LAND RESOURCES.
W71-10270 06E

MISSOURI RIVER
MISSOURI RIVER BASIN WATER QUALITY STANDARDS.
W71-10113 05G

MITES
EFFECTS OF MANURE APPLICATIONS AND MITE PREDATION ON CORN ROOTWORM POPULATIONS IN MINNESOTA,
W71-10359 05C

MIXING
DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
W71-09942 05B

DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL(FRENCH CONNEES SUR LES CHARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
W71-10046 02K

AN INTRODUCTION TO DETERMINATION OF ESTUARINE ASSIMILATIVE CAPACITY,
W71-10093 05B

SURFACE DISTURBANCE FROM SUBMERGED JET,
W71-10171 08B

MODEL STUDIES
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
W71-09936 05B

TENTATIVE LABORATORY INVESTIGATION OF DIVAGATING-RIVER BANK DESTRUCTION-(RUSSIAN OPYT ISSLEDOVANIYA V LABORATORNYKH USLOVIYAKH RAZRUSHENIYA BEREGOV (DEYGISHA) NA BLUZHDAYUSHCHIKH REKAKH),
W71-09971 02J

OUTLET STRUCTURE FOR EAU GALLE RESERVOIR, EAU GALLE RIVER, WISCONSIN, HYDRAULIC MODEL INVESTIGATION,
W71-09998 08B

NAVIGATION CONDITIONS AT MILLERS FERRY LOCK AND DAM, ALABAMA RIVER, ALABAMA. HYDRAULIC MODEL INVESTIGATION,
W71-09999 08B

EFFECTS OF HURRICANE BARRIER ON NAVIGATION CONDITIONS IN EAST PASSAGE, NARRAGANSETT BAY, RHODE ISLAND HYDRAULIC MODEL INVESTIGATION,
W71-10000 08B

MODERNIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY HYDRAULIC MODEL INVESTIGATION,
W71-10001 08B

CONTROL STRUCTURE, LITTLE SIOUX RIVER, IOWA, HYDRAULIC MODEL INVESTIGATION,
W71-10002 08B

MAGIC ISLAND COMPLEX, INCLUDING KEWALO BASIN AND ALA WAI BOAT HARBOR, HONOLULU, OAHU, HAWAII. HYDRAULIC MODEL INVESTIGATION,
W71-10003 08B

DROP STRUCTURE FOR GERING VALLEY PROJECT, SCOTTSBLUFF COUNTY, NEBRASKA HYDRAULIC MODEL INVESTIGATION,
W71-10004 08B

NAVIGATION CONDITIONS AT MCALPINE LOCKS AND DAM, OHIO RIVER. HYDRAULIC MODEL INVESTIGATION,
W71-10005 08B

NAVIGATION CONDITIONS AT COLUMBIA LOCK AND DAM, OUACHITA RIVER LOUISANA,
W71-10006 08B

STABILITY OF PROPOSED BREAKWATER, BURNS WATERWAY HARBOR, INDIANA HYDRAULIC MODEL INVESTIGATION,
W71-10007 08B

SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN HYDRAULIC MODEL INVESTIGATION,
W71-10008 08B

W71-10009 08B

THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
W71-10020 02A

RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
W71-10061 08B

DESIGNS FOR RUBBLE -MOUND BREAKWATERS, DANA POINT HARBOR, CALIFORNIA,
W71-10199 08B

IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (IDENTIFIKATSIYA NELINEYNYKH GIDROLOGICHESKIKH SISTEM),
W71-10342 02E

A STORM FLOOD HYDROGRAPH FORECAST FOR RIVERS ON THE MARITIME TERRITORY FROM RUNOFF OF REPRESENTATIVE BASINS (METODIKA PROGNOZA GIDROGRAFA DOZHDEVYKH PAVODKOV REK PRIMOR'YA NA OSNOVE UCHETA STOKA POKAZATEL'NYKH BASSEYNOV),
W71-10344 04A

AQUIFER MODEL RESEARCH REVIEWED.
W71-10416 02F

MOISTURE CONTENT
AN ELECTROMETRIC METHOD FOR THE DETERMINATION OF SOIL MOISTURE,
W71-10012 02G

MOLLUSCACIDES
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
W71-09997 05A

MOLLUSCICIDES
IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
W71-09995 05A

MOLLUSKS
THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
W71-09982 05A

AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE AGENTS,
W71-10211 05C

MOLYBDENUM
ATOMIC ABSORPTION DETERMINATION OF MICROGRAM QUANTITIES OF MOLYBDENUM IN LAKE WATERS,
W71-10077 07B

MONITORING
EXISTING LEVELS OF NITRATES IN WATERS - THE ILLINOIS SITUATION,
W71-09956 05A

MONTANA
WATER POLLUTION (STATUTORY AUTHORITY FOR ADMINISTERING POLLUTION CONTROL PROGRAM).
W71-10291 06E

MOSSYROCK DAM(WASH)
MODEL STUDY OF POWER INTAKE GATE OF MOSSYROCK DAM,
W71-10168 08C

MUDFLOWS
MUD FLOW OCCURRENCES IN THE RSFSR (RASPROSTRANENIYE SELEY NA TERRITORII RSFSR),
W71-10351 02J

MUD-WATER INTERFACES
MUD FLOW OCCURRENCES IN THE RSFSR (RASPROSTRANENIYE SELEY NA TERRITORII RSFSR),
W71-10351 02J

MULTI PURPOSE PROJECTS
SEAWATER DESALTING WITH CHEMICAL RECOVERY.
W71-09975 03A

MULTIPLE PURPOSE PROJECTS
THE DETERMINATION OF POWER BENEFITS FROM A MULTIPURPOSE WATER PROJECT,
W71-10383 06B

MULTIPLE-PURPOSE PROJECTS
WATER CONSERVATION COMMISSION.
W71-10294 06E

MUNICIPAL WATER
PROTECTION OF MUNICIPAL WATER SUPPLY.
W71-10147 06E

ACT AUTHORIZING MUNICIPAL CORPORATIONS TO PURCHASE OR CONDEMN LAND FOR WATERWORKS AND THE PROTECTION THEREOF FROM POLLUTION.
W71-10242 06E

CONTROL OF CONTAMINATION AND POLLUTION IN SPECIAL AREAS AND WATERS.
W71-10245 06E

WATER AND SEWAGE.
W71-10442 06E

NATIONAL ENVIRONMENTAL POLICY ACT
COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT.
W71-10284 06E

NATURAL FLOW
WATER RIGHTS.
W71-10237 06F

NATURAL GAS
POLLUTION OF THE HIGH SEAS RESULTING FROM DRILLING AND PRODUCING OPERATIONS--FEDERAL JURISDICTION AND OPERATOR LIABILITY,
W71-10112 05G

NAVIGATION
LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

NETHERLANDS
DESIGN LEVELS IN THE TRANSITION ZONE BETWEEN THE TIDAL REACH AND THE RIVER REGIME REACH,
W71-10039 08B

NETWORK DESIGN
EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
W71-10314 07A

NEUTRON ATTENUATION DENSIMETERS
DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
W71-09950 02J

NEVADA
PROCEEDINGS OF TWENTY-FOURTH ANNUAL NEVADA WATER CONFERENCE.
W71-09951 06B

STATE WATER POLLUTION CONTROL.
W71-10306 06E

PROTECTION OF LAKE TAHOE WATERSHED.
W71-10307 06E

WATER POLLUTION IN GENERAL.
W71-10443 06E

NEVADA WATER CONFERENCE
PROCEEDINGS OF TWENTY-FOURTH ANNUAL NEVADA WATER CONFERENCE.
W71-09951 06B

NEW ENGLAND
INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
W71-09945 04A

NEW MEXICO
WATER QUALITY ACT.
W71-10290 06E

POLLUTING WATER.
W71-10449 06F

NEW YORK
CONSTITUTIONAL POLICY FAVORING CONSERVATION.
W71-10288 06F

NEWTON'S ITERATION TECHNIQUE
OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
W71-10018 02E

NILE DELTA
REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
W71-10051 02F

THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
W71-10053 02F

NITRATE
POLLUTION - HOW MUCH OF A PROBLEM COMES FROM FERTILIZERS,
W71-10099 05C

NITRATE REMOVAL
TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
W71-09961 05B

NITRATES
NITRATE AND WATER SUPPLY SOURCE AND CONTROL.
W71-09952 05B

NITRATES IN WATER SUPPLIES - THE PROBLEM,
W71-09953 05B

THE NITROGEN CYCLE.
W71-09954 05B

EXISTING LEVELS OF NITRATES IN WATER - THE CALIFORNIA SITUATION,
W71-09955 05B

EXISTING LEVELS OF NITRATES IN WATERS - THE ILLINOIS SITUATION,
W71-09956 05A

THE HEALTH EFFECTS OF NITRATES IN WATER (PANEL DISCUSSION),
W71-09957 05B

SECONDARY EFFECTS OF NITROGEN IN WATER,
W71-09958 05B

URBAN SOURCES OF NITRATES,
W71-09959 05B

TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
W71-09961 05B

NITRIFICATION
CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
W71-09960 05B

EFFECT OF MANURE APPLICATION, AERATION, AND SOIL PH ON SOIL NITROGEN TRANSFORMATIONS AND ON CERTAIN SOIL TEST VALUES,
W71-10357 05D

NITROGEN
THE NITROGEN CYCLE.
W71-09954 05B

POLLUTION - HOW MUCH OF A PROBLEM COMES FROM FERTILIZERS,
W71-10099 05C

NITROGEN COMPOUNDS
CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
W71-09960 05B

NITROGEN CYCLE
THE NITROGEN CYCLE.
W71-09954 05B

NITROGEN REMOVAL
CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
W71-09960 05B

NON-STRUCTURAL ALTERNATIVES
SPECIAL TAX WRITE-OFF FOR POLLUTION CONTROL DEVICES.
W71-10139 06E

MISSOURI WATER PLAN, STATE LAWS, POLICIES AND PROGRAMS PERTAINING TO WATER AND RELATED LAND RESOURCES.
W71-10270 06E

TAX INCENTIVE FOR COMPLIANCE WITH WATER POLLUTION LAWS AND STANDARDS.
W71-10297 06E

NORTH CAROLINA
HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
W71-10050 02L

NORTH DAKOTA
FOULING OF WATERS A MISDEMEANOR.
W71-10293 06E

WATER CONSERVATION COMMISSION.
W71-10294 06E

NUCLEAR MOISTURE METERS
DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
W71-09950 02J

NUCLEAR POWERPLANTS
LICENSING OF PRODUCTION AND UTILIZATION FACILITIES (NUCLEAR POWER REACTORS).
W71-10286 06E

NUISANCE
A1A MOBILE HOME PARK, INC V BREVARD COUNTY (INJUNCTION TO PREVENT CONSTRUCTION AND OPERATION OF SEWAGE TREATMENT PLANT).
W71-10302 06E

NUISANCE LAW
STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
W71-10103 05C

NUMERICAL ANALYSIS
HYDRAULIC CALCULATION OF WATER DISCHARGE AND LEVELS IN RIVER DELTAS,
W71-10038 02E

SPECIES DIVERSITY SPECIES ABUNDANCE OF FISH POPULATIONS AN EXAMINATION OF VARIOUS METHODS,
W71-10210 07C

NURSERY AREAS
COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

NUTRIENTS
THE NITROGEN CYCLE.

W71-09958 05B

SECONDARY EFFECTS OF NITROGEN IN WATER,
W71-09958 05B

DISSOLVED ORGANIC COMPOUNDS AND THEIR UTILIZATION IN TWO MARL LAKES,
W71-10091 05C

EFFECT OF AGRICULTURE ON WATER QUALITY,
W71-10376 05G

OBSERVATION WELLS
OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
W71-10413 04B

OBSTRUCTION TO FLOW
WATER RIGHTS.
W71-10237 06E

DISCHARGING REFUSE INTO DRAINAGE FACILITIES PROHIBITED.
W71-10247 06E

OCEANS
OCEAN POLLUTION MESSAGE,
W71-10132 06E

ODOR
AIR POLLUTION FROM ANIMAL WASTES,
W71-10101 05A

A1A MOBILE HOME PARK, INC V BREVARD COUNTY (INJUNCTION TO PREVENT CONSTRUCTION AND OPERATION OF SEWAGE TREATMENT PLANT).
W71-10302 06E

ANIMAL WASTE DISPOSAL BECOMES A MORE DIFFICULT PROBLEM,
W71-10362 05D

ODOR IDENTIFICATION
AIR POLLUTION FROM ANIMAL WASTES,
W71-10101 05A

ODOROUS COMPOUNDS
AIR POLLUTION FROM ANIMAL WASTES,
W71-10101 05A

OFFSHORE PLATFORMS
PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
W71-10175 08A

OGALLALA FORMATION
OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
W71-10413 04B

AQUIFER MODEL RESEARCH REVIEWED.
W71-10416 02F

AVERAGE WATER TABLE DECLINE.
W71-10417 04B

OHIO
OHIO V WYANDOTTE CHEMICALS CORP (SUPREME COURT DECLINES ORIGINAL JURISDICTION OVER WATER POLLUTION COMPLAINT BY STATE),
W71-10153 06E

PEYTON V HAMNER (NO PRESCRIPTIVE RIGHT TO POLLUTE STREAM),
W71-10154 06E

OIL FIELDS
CORPORATIONS TO STORE SALT WATER,
W71-10097 06E

OIL INDUSTRY
CONSERVATION COMMITTEE TO PREVENT POLLUTION OF WATERS BY OIL INDUSTRY.
W71-10073 06E

OIL POLLUTION
CONCEPT DEVELOPMENT OF A HEAVY DUTY OIL CONTAINMENT SYSTEM FOR USE ON THE HIGH SEAS. VOLUME II. APPENDIX,
W71-10164 05G

LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
W71-10165 05G

HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

ATLANTA COASTAL REGION, MULTI AGENCY OIL AND HAZARDOUS MATERIALS, POLLUTION CONTINGENCY PLAN, REGION IV.
W71-10200 05G

OIL SPILLS
THE SANTA BARBARA OIL SPILL,
W71-10266 05G

TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

OIL WASTES
DISCHARGES INTO CERTAIN WATERS.
W71-10085 06E

DISCHARGES OF OIL FOR RESEARCH, DEVELOPMENT AND DEMONSTRATION PURPOSES.
W71-10134 06E

DISPOSAL OF OIL WASTES.
W71-10142 06E

CONCEPT DEVELOPMENT OF A HEAVY DUTY OIL CONTAINMENT SYSTEM FOR USE ON THE HIGH SEAS. VOLUME II. APPENDIX,
W71-10164 05G

LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
W71-10165 05G

HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

ATLANTA COASTAL REGION, MULTI AGENCY OIL AND HAZARDOUS MATERIALS, POLLUTION CONTINGENCY PLAN, REGION IV.
W71-10200 05G

DISPOSAL OF CERTAIN SUBSTANCES OPERATION OF CERTAIN EQUIPMENT.
W71-10219 06E

WATER POLLUTION CONTROL ACT.
W71-10225 06E

INTRUSION AND POLLUTION OF WATER--RELATIONSHIPS WITH GAS AND OIL.
W71-10250 06E

DISPOSAL OF BRINES AND MINERALIZED WATERS.
W71-10441 06E

OIL WELLS
WELL REGULATIONS AND POLLUTION ABATEMENT.
W71-09933 06E

INTRUSION AND POLLUTION OF WATER--RELATIONSHIPS WITH GAS AND OIL.
W71-10250 06E

GENERAL RULES AND REGULATIONS RELATING TO WELLS.
W71-10260 06E

REGULATION OF OIL AND GAS WELLS.
W71-10440 06E

OILY WATER
RULES FOR THE PREVENTION AND CONTROL OF OIL POLLUTION IN THE WATERS OF THE COMMONWEALTH.
W71-10115 05G

FINANCIAL RESPONSIBILITY FOR OIL POLLUTION CLEANUP.
W71-10133 06E

TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

OKLAHOMA
LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

POWERS AND DUTIES OF STATE CONSERVATION COMMISSION AND WATER RESOURCES BOARD.
W71-10141 06E

DISPOSAL OF OIL WASTES.
W71-10142 06E

W71-10143 06E

OKLAHOMA WATER LAW, STREAM AND SURFACE, THE WATER CONSERVATION STORAGE COMMISSION AND THE 1965 AND 1967 AMENDMENTS,
W71-10215 06E

FUNCTIONS OF HEALTH DEPARTMENTS (WATER POLLUTION AND QUALITY CONTROL).
W71-10236 06E

WATER RIGHTS.
W71-10237 06E

OKLAHOMA WATER POLLUTION CONTROL ACT OF 1955.
W71-10238 06E

WASTE TREATMENT FACILITIES.
W71-10239 06E

POLLUTION CONTROL COORDINATING ACT OF 1968.
W71-10240 06E

DELETERIOUS SUBSTANCES IN STREAMS (CRIMINAL PENALTIES AND ABATEMENT).
W71-10241 06E

ACT AUTHORIZING MUNICIPAL CORPORATIONS TO PURCHASE OR CONDEMN LAND FOR WATERWORKS AND THE PROTECTION THEREOF FROM POLLUTION.
W71-10242 06E

OKLAHOMA FEED YARDS ACT.
W71-10243 06E

OKLAHOMA RESOURCES DEVELOPMENT ACT OF 1965.
W71-10244 06E

POLLUTION AND ATTENDANT PROBLEMS,
W71-10261 05G

WATER AND SEWAGE.
W71-10482 06E

ON-SITE LABORATORIES
BUILDING AND OPERATING A FLOATING LABORATORY,
W71-09986 09C

ON-SITE TESTS
DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
W71-09997 05A

OPEN CHANNEL FLOW
OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
W71-10018 02E

FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
W71-10173 08B

STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
W71-10317 08B

OPERATION AND MAINTENANCE
PLANT OPERATION (WASTE TREATMENT DISPOSAL REQUIREMENTS).
W71-10300 06E

OPTIMAL CONTROL THEORY
PROCESS CONTROL MODEL FOR OXYGEN REGENERATION OF POLLUTED RIVERS, PHASE II,
W71-10162 05G

OPTIMIZATION
PROCESS CONTROL MODEL FOR OXYGEN REGENERATION OF POLLUTED RIVERS, PHASE II,
W71-10162 05G

OREGON
ENVIRONMENTAL QUALITY COMMISSION.
W71-10184 06E

WATER POLLUTION.
W71-10185 06E

PROTECTION OF WATER SUPPLY GENERALLY.
W71-10186 06E

PROTECTION OF MUNICIPAL WATER SUPPLY.
W71-10187 06E

TAX RELIEF ON POLLUTION CONTROL FACILITIES.
W71-10188 06E

POLLUTION CONTROL BONDS.
W71-10189 06E

CONTROL OF CONTAMINATION AND POLLUTION IN SPECIAL AREAS AND WATERS.
W71-10285 06E

STATE MARINE BOARD.
W71-10286 06E

DISCHARGING REFUSE INTO DRAINAGE FACILITIES PROHIBITED.
W71-10287 06E

PLANT OPERATION (WASTE TREATMENT DISPOSAL REQUIREMENTS).
W71-10300 06E

STATE FINANCIAL ASSISTANCE TO PUBLIC AGENCIES FOR POLLUTION CONTROL FACILITIES.
W71-10301 06E

IMPROVEMENT OF WATERCOURSES OR DRAINS WEST OF CASCADES.
W71-10438 06E

KLAMATH RIVER BASIN COMPACT.
W71-10439 06E

ORGANIC COMPOUNDS
DISSOLVED ORGANIC PHOSPHORUS EXCRETION BY MARINE PHYTOPLANKTON,
W71-10083 05C

ORGANIC MATTER
DISSOLVED ORGANIC MATTER AND PHYTOPLANKTONIC PRODUCTIVITY IN MARL LAKES,
W71-10079 05C

THE FOOD SOURCES OF LAKE ZOOPLANKTON (IN POLISH),
W71-10098 05C

THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

'POLYWATER' AND SWEAT - SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

ORGANIC CARBON AND NITROGEN IN THE SURFACE SEDIMENTS OF LAKES ONTARIO, ERIE, AND HURON,
W71-10327 05A

ORGANIC PESTICIDES
ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

ORGANIC WASTES
THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

ORGANOMERCURIALS
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

OSMOSIS
HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
W71-09991 05C

OUTLET WORKS
OUTLET STRUCTURE FOR EAU GALLE RESERVOIR, EAU GALLE RIVER, WISCONSIN, HYDRAULIC MODEL INVESTIGATION,
W71-09998 08B

OVERLAND FLOW
ESTIMATION OF SURFACE WTER LAG TIME FROM THE KINEMATIC WAVE EQUATIONS,
W71-10022 02E

OXYGEN BALANCE
AN INTRODUCTION TO DETERMINATION OF ESTUARINE ASSIMILATIVE CAPACITY,
W71-10093 05B

OXYGENATION
EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

OYSTERS
DIGESTION OF OYSTERS FOR THE DETERMINATION OF MERCURY,
W71-10092 05A

TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

PALAEMONETES KADIAKENSIS
LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS,
W71-10084 05C

PALEOCURRENT INDICATORS
WIND-ORIENTED GASTROPOD SHELLS AS INDICATORS OF PALEOWIND DIRECTION,
W71-10330 02J

PAMLICO ESTUARY(NC)
HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
W71-10050 02L

PARAMETRIC HYDROLOGY
THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
W71-10020 02A

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

PARTICLE MOVEMENT(BED LOAD)
LONGITUDINAL DISPERSION OF BED-MATERIAL PARTICLES,
W71-10169 02J

PARTICLE SHAPE
ANALYSIS OF SEDIMENTATION DATA,
W71-10315 02J

PARTICLE SIZE
PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (RUSSIAN - FOTOGRAFICHESKIY METOD GRANULOMETRICHESKOGO ANALIZA KRUPNYKH NANOSOV),
W71-09966 02J

PARTICLE SIZE, WATER-STABLE AGGREGATES, AND BACTERIAL POPULATIONS IN LAKE SEDIMENTS,
W71-10069 05C

DURABILITIES OF SAND SIZE SCHIST AND 'VOLCANIC' ROCK FRAGMENTS DURING FLUVIAL TRANSPORT, ELK CREEK, BLACK HILLS, SOUTH DAKOTA,
W71-10329 02J

SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
W71-10332 02J

PATH OF POLLUTANTS
DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
W71-09942 05B

NITRATE AND WATER SUPPLY - SOURCE AND CONTROL.
W71-09952 05B

NITRATES IN WATER SUPPLIES - THE PROBLEM,
W71-09953 05B

THE NITROGEN CYCLE.
W71-09954 05B

WATER POLLUTION AND SELF-PURIFICATION STUDY ON THE PO RIVER BELOW FERRARA,
W71-10324 05B

TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
W71-10326 05B

PEAK DISCHARGE
A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAYKAL BASED ON PRECIPITATION (RUSSIAN PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
W71-10181 04A

PENNSYLVANIA
FREEDMAN V BOROUGH OF WEST HAZELTON (PUBLIC NUISANCE CAUSED BY DISCHARGE OF SEWAGE INTO DITCH).
W71-10197 06E

TREATMENT REQUIREMENTS.
W71-10276 06E

MINE DRAINAGE.
W71-10277 06E

SPECIAL REGULATIONS.
W71-10278 06E

REGULATIONS FOR PUBLIC WATER SUPPLIES.
W71-10279 06E

PERMAFROST
ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
W71-10049 02C

PERMEABILITY
LABORATORY EVALUATIONS OF CANAL SOIL SEALANTS. AN OPEN AND CLOSED CONDUIT SYSTEMS INVESTIGATION OF FOUR PROPRIETARY MATERIALS PROPOSED AS CANAL SOIL SEALANTS ON SILTY SAND IN LABORATORY PERMEAMETERS,
W71-10201 08D

PERMEABILITY TESTS
LABORATORY EVALUATIONS OF CANAL SOIL SEALANTS. AN OPEN AND CLOSED CONDUIT SYSTEMS INVESTIGATION OF FOUR PROPRIETARY MATERIALS PROPOSED AS CANAL SOIL SEALANTS ON SILTY SAND IN LABORATORY PERMEAMETERS,
W71-10201 08D

PERMITS
ADMINISTRATIVE PROCEDURE (PERMITS FOR DISCHARGES OR DEPOSITS INTO NAVIGABLE WATERS).
W71-10135 06E

REGULATIONS FOR PREVENTION OF POLLUTION OF SUBSURFACE WATERS OF THE STATE,
W71-10157 05G

BY-PASSING OF SEWAGE, INDUSTRIAL, AND OTHER WASTE TREATMENT PLANTS AND EMERGENCY, ACCIDENTAL, OR OTHER EXCESSIVE SPILLS AND DISCHARGES OF SEWAGE, INDUSTRIAL OR OTHER WASTES.
W71-10167 05G

INJECTION WELL ACT.
W71-10229 06E

OKLAHOMA WATER POLLUTION CONTROL ACT OF 1955.
W71-10238 06E

PERMITS TO DISCHARGE SEWAGE, INDUSTRIAL WASTES OR OTHER WASTES.
W71-10273 06E

MINE DRAINAGE.
W71-10277 06E

WATER POLLUTION CONTROL.
W71-10298 06E

PROTECTION OF LAKE TAHOE WATERSHED.
W71-10307 06E

DISPOSAL OF BRINES AND MINERALIZED WATERS.
W71-10441 06E

PERSISTENCE
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

PESTICIDE DRIFT
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

PESTICIDE KINETICS
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

DDT RESIDUES IN MARINE PHYTOPLANKTON INCREASE FROM 1955 TO 1969,
W71-09984 05A

PESTICIDES IN THE MARINE ENVIRONMENT,
W71-09992 05C

CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER FLOUNDER, PSEUDO-PLEURONECTES AMERICANUS, FROM THE NEWFANTIC RIVER ESTUARY, MASSACHUSETTS,
W71-10212 05C

PESTICIDE RESIDUES
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

DDT RESIDUES IN MARINE PHYTOPLANKTON INCREASE FROM 1955 TO 1969,
W71-09984 05A

PESTICIDES IN THE MARINE ENVIRONMENT,
W71-09992 05C

THE CONTRIBUTION OF URBAN AND AGRICULTURAL PESTICIDE USE TO THE CONTAMINATION OF THE RED CEDAR RIVER,
W71-10035 05B

RESIDUES OF DDT, DDE AND DDD IN FISH IN THE SASKATCHEWAN RIVER AFTER USING DDT AS A BLACKFLY LARVICIDE FOR TWENTY YEARS,
W71-10086 05C

CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER FLOUNDER, PSEUDO-PLEURONECTES AMERICANUS, FROM THE NEWFANTIC RIVER ESTUARY, MASSACHUSETTS,
W71-10212 05C

PESTICIDE TOXICITY
PESTICIDES IN THE MARINE ENVIRONMENT,
W71-09992 05C

FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

PESTICIDES
PESTICIDES IN THE MARINE ENVIRONMENT,
W71-09992 05C

PESTICIDE POLLUTION,
W71-10264 05G

EFFECT OF AGRICULTURE ON WATER QUALITY,
W71-10376 05G

PHOSPHATES
SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
W71-10070 05C

PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,
W71-10207 05C

PHOSPHORUS
DISSOLVED ORGANIC PHOSPHORUS EXCRETION BY MARINE PHYTOPLANKTON,
W71-10083 05C

PHOTOGRAPHY
PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (RUSSIAN FOTOGRAFICHESKIY METOD GRANULOMETRICHESKOGO ANALIZA KRUPNYKH NANOSOV),
W71-09966 02J

PHOTOMETRY
A SIMPLE, SENSITIVE UNDERWATER PHOTOMETER,
W71-10089 07B

PHOTOSYNTHESIS
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

DISSOLVED ORGANIC COMPOUNDS AND THEIR UTILIZATION IN TWO MARL LAKES,
W71-10091 05C

EFFECTS OF ZOOPLANKTON ON PHOTOSYNTHESIS BY ALGAE IN LAKES,
W71-10098 05C

PHREATIC LINES
PHREATIC SURFACE LOCATION AFTER DRAWDOWN,
W71-10390 08D

PHYSICAL PROPERTIES
PROPERTIES OF FARM ANIMAL EXCRETA,
W71-10109 05A

PHYSICOCHEMICAL PROPERTIES
DEVELOPMENT OF PHYSICO-CHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS PRECEDING SUMMER STAGNATION IN A RESERVOIR (IN FRENCH),
W71-10087 05C

PHYSIOLOGICAL ECOLOGY
THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
W71-09982 05A

EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

PHYTOPLANKTON
DDT RESIDUES IN MARINE PHYTOPLANKTON INCREASE FROM 1955 TO 1969,
W71-09984 05A

COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

ZOOPLANKTON-PHYTOPLANKTON RELATIONSHIPS IN DEVILS LAKE, NORTH DAKOTA,
W71-10063 05C

PHYTOPLANKTON COEFFICIENTS AS A METHOD OF DEFINING THE DEGREE TO WHICH WATER HABITATS ARE TROPHIC (IN POLISH),
W71-10075 05C

DISSOLVED ORGANIC MATTER AND PHYTOPLANKTONIC PRODUCTIVITY IN MARL LAKES,
W71-10079 05C

DISSOLVED ORGANIC PHOSPHORUS EXCRETION BY MARINE PHYTOPLANKTON,
W71-10083 05C

PILOT PLANTS
VTE PILOT PLANT ANNUAL REPORT FOR THE PERIOD ENDING JULY 1, 1968,
W71-09976 03A

PIPE FLOW
JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
W71-10178 08B

TRANSIENTS IN PIPELINES CARRYING LIQUIDS OR GASES,
W71-10395 08B

PIPE JUNCTIONS
JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
W71-10178 08B

PIPELINES
TRANSIENTS IN PIPELINES CARRYING LIQUIDS OR GASES,
W71-10395 08B

PLACER MINING
PLACER MINING WATER POLLUTION,
W71-09934 06E

WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (ROSSYPI SLOYA VOLNOVOY PERERABOTKI I IKH GENETICHESKIYE OSOBENNOSTI).
W71-10340 02J

PLACERS
WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (ROSSYPI SLOYA VOLNOVOY PERERABOTKI I IKH GENETICHESKIYE OSOBENNOSTI).
W71-10340 02J

PLANNING
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

PROCEEDINGS OF TWENTY-FOURTH ANNUAL NEVADA WATER CONFERENCE.
W71-09951 06B

SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
W71-10028 02A

ATLANTA COASTAL REGION, MULTI AGENCY OIL AND HAZARDOUS MATERIALS, POLLUTION CONTINGENCY PLAN, REGION IV.
W71-10200 05G

PLANNING MODELS
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

PLANT MORPHOLOGY
THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
W71-10090 05C

PLANT PHYSIOLOGY
THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
W71-10090 05C

PLANTING MANAGEMENT
PAHRUMP FIELD LABORATORY,
W71-10418 03F

PLASTIC PIPES
SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
W71-10387 03F

PNEUMATIC SYSTEMS
HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

PO RIVER(ITALY)
WATER POLLUTION AND SELF-PURIFICATION STUDY ON THE PO RIVER BELOW FERRARA,
W71-10324 05B

POISONS
POWER OVER WATER POLLUTION CONTROL AND PENALTY FOR POISONING OF WATERS.
W71-10296 06E

COPPER/BICARBONATE EQUILIBRIA IN SOLUTIONS OF BICARBONATE ION AT CONCENTRATIONS SIMILAR TO THOSE FOUND IN NATURAL WATER,
W71-10323 05A

POLITICAL ASPECTS
ENVIRONMENT REPORT--BILLS TO AUTHORIZE CLASS ACTIONS RECOGNIZE RIGHT TO CLEAN ENVIRONMENT,
W71-10274 06E

POLLUTANT IDENTIFICATION
LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

POLLUTION OF AQUATIC HABITATS.
W71-10081 06E

AIR POLLUTION FROM ANIMAL WASTES,
W71-10101 05A

IDENTIFICATION OF METABOLITES OF N - (1, 1-DIMETHYLPROPINYL) - 3,5 DICHLORBENZAMINE IN RAT AND COW URINE AND RAT FECES,
W71-10356 05A

POLLUTANTS
POLLUTION POTENTIAL OF LIVESTOCK FEEDING OPERATIONS IN SOUTH DAKOTA,
W71-10104 05D

CITY OF HIGHLAND V AUER (CITY'S LIABILITY FOR PERMITTING RESIDENTS TO POLLUTE ITS SEWERS).
W71-10198 06E

TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

POLLUTION ABATEMENT
PLACER MINING WATER POLLUTION,
W71-09934 06E

CREATION OF THE STATE BOARD OF HEALTH.
W71-09988 06E

NUISANCE (WATER POLLUTION).
W71-10078 06E

BASIN REGULATIONS--WATER QUALITY (WATER QUALITY STANDARDS, ABATEMENT, AND ENFORCEMENT PROCEDURES).
W71-10116 05G

ENVIRONMENTAL LAW NEW LEGAL CONCEPTS IN THE ANTIPOLLUTION FIGHT,
W71-10118 05G

CONSERVATION OF OIL AND GAS.
W71-10140 06E

WATER POLLUTION.
W71-10145 06E

POLLUTION CONTROL BONDS.
W71-10149 06E

BASS ANGLERS SPORTSMAN'S SOC'Y V US PLYWOOD-CHAMPION PAPERS, INC (PRIVATE PARTY HAS NO RIGHT TO ENFORCE ANTI-POLLUTION PROVISION OF RIVERS AND HARBORS ACT).
W71-10150 06E

DRAINAGE DISTRICTS--POLLUTION CONTROL.
W71-10151 06E

PEYTON V HAMMER (NO PRESCRIPTIVE RIGHT TO POLLUTE STREAM),
W71-10154 06E

COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

PENALTIES FOR OIL DEPOSITED IN STATE WATERS.
W71-10218 06E

SEWAGE AND OTHER WASTE PROCEDURE FOR ABATEMENT.
W71-10222 06E

WATER POLLUTION CONTROL.
W71-10223 06E

WATER POLLUTION.
W71-10227 06E

WATER POLLUTION--OIL DISCHARGES.
W71-10235 06E

OKLAHOMA WATER POLLUTION CONTROL ACT OF 1955.
W71-10238 06E

DELETERIOUS SUBSTANCES IN STREAMS (CRIMINAL PENALTIES AND ABATEMENT).
W71-10241 06E

OKLAHOMA RESOURCES DEVELOPMENT ACT OF 1965.
W71-10244 06E

WATER POLLUTION ABATEMENT,
W71-10252 06E

WATER POLLUTION CONTROL IN COLORADO,
W71-10258 05G

PESTICIDE POLLUTION,
W71-10264 05G

ANNUAL REPORT 1970.
W71-10268 05G

SPECIAL REGULATIONS.
W71-10278 06E

ENVIRONMENTAL CONTROL ACT.
W71-10280 06E

ENVIRONMENTAL QUALITY CONTROL.
W71-10289 06E

WATER QUALITY ACT.
W71-10290 06E

CONCERNING WATER POLLUTION, AND PROVIDING PENALTIES FOR VIOLATIONS RELATING TO POLLUTION OF STATE WATERS.
W71-10295 06E

REGULATIONS ON POLLUTION ABATEMENT.
W71-10304 06E

STATE WATER POLLUTION CONTROL.
W71-10306 06E

PROTECTION OF LAKE TAHOE WATERSHED.
W71-10307 06E

POLLUTION AS NUISANCE.
W71-10361 06E

DESIGN FOR FEEDLOT WASTE MANAGEMENT - HISTORY AND CHARACTERISTICS,
W71-10371 05G

MAJOR PROBLEMS OF WATER POLLUTION CREATED BY AGRICULTURAL PRACTICES,
W71-10374 05G

REMOVAL OF SUBSTANCES POLLUTING WATERS.
W71-10378 06E

MINIMUM STANDARDS OF SANITATION AND HEALTH PROTECTION MEASURES.
W71-10437 06E

REGULATION OF OIL AND GAS WELLS.
W71-10440 06E

WATER POLLUTION IN GENERAL.
W71-10443 06E

POLLUTION LAWS
STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
W71-10103 05C

POLLUTION POTENTIAL
POLLUTION POTENTIAL OF LIVESTOCK FEEDING OPERATIONS IN SOUTH DAKOTA,
W71-10104 05D

POLYCHLORINATED BENZENES
TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

POLYSTREAM
TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

POLYWATER
'POLYWATER' AND SWEAT SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

POPULATION EQUIVALENTS
POLLUTION POTENTIAL OF LIVESTOCK FEEDING OPERATIONS IN SOUTH DAKOTA,
W71-10104 05D

MAJOR PROBLEMS OF WATER POLLUTION CREATED BY AGRICULTURAL PRACTICES,
W71-10374 05G

POROUS MEDIA
VARIATION OF SPECIFIC RETENTION IN RUBBLY ROCK PARTICLES,
W71-10019 02F

VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
W71-10318 02F

PORTAGE CREEK(MICH)
INTERRELATIONS OF SEVERAL ABIOTIC FACTORS AND THE HIGHER AQUATIC PLANTS IN A STREAM ECOSYSTEM,
W71-10036 05C

POTABLE WATER
FURNISHING POTABLE WATER.
W71-10435 06E

POULTRY
THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
W71-10355 05D

VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

DISPOSAL OF HATCHERY WASTES,
W71-10364 05D

POULTRY LITTER
THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

PRECIPITATION(ATMOSPHERIC)
A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
W71-10319 02B

CALCULATING PRECIPITATION IN WATER BALANCE ESTIMATES (UCHET OSADKOV PRI VODNOBALANSOVYKH RASCHETAKH).
W71-10346 02B

PRECIPITATION ADJUSTMENTS FOR RAIN-GAGE BUCKET WETTING (K VOPROSU O POPRAVKAKH K OSADKAM NA SMACHIVANIYE VEDRA),
W71-10348 02B

PREDACEOUS MITES
EFFECTS OF MANURE APPLICATIONS AND MITE PREDATION ON CORN ROOTWORM POPULATIONS IN MINNESOTA,
W71-10359 05C

PREDATION
EFFECTS OF MANURE APPLICATIONS AND MITE PREDATION ON CORN ROOTWORM POPULATIONS IN MINNESOTA,
W71-10359 05C

PRESERVATION
CONSTITUTIONAL POLICY FAVORING CONSERVATION.
W71-10288 06E

PRIMARY PRODUCTIVITY
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

PRIMARY PRODUCTIVITY MEASUREMENTS AT DEVILS LAKE, NORTH DAKOTA,
W71-10062 05C

DISSOLVED ORGANIC MATTER AND PHYTOPLANKTONIC PRODUCTIVITY IN MARL LAKES,
W71-10079 05C

RECENT AND POSTGLACIAL PRODUCTION RATES OF A MARL LAKE,
W71-10080 05C

DEVELOPMENT OF PHYSICO-CHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS PRECEDING SUMMER STAGNATION IN A RESERVOIR (IN FRENCH),
W71-10087 05C

PRIMARY PRODUCTION DEPRESSION OF OXYGEN EVOLUTION IN ALGAL CULTURES BY ORGANOPHOSPHORUS INSECTICIDES,
W71-10096 05C

PROBABILITY
PARAMETER ESTIMATION FOR WET-DAY SEQUENCES,
W71-10023 02B

PRODUCTIVITY
DISSOLVED ORGANIC COMPOUNDS AND THEIR UTILIZATION IN TWO MARL LAKES,
W71-10091 05C

PROFILES
NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,
W71-10010 07C

HYDRAULIC CHARACTERISTICS OF THE HYDROMETRIC SECTION AT THE MOUTH OF THE SULINA ARM (FRENCH CARACTERISTIQUES HYDRAULIQUES DE LA SECTION HYDROMETRIQUE A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10043 02J

PROJECT PLANNING
ENVIRONMENTAL STATEMENTS--PROPOSED GUIDELINES ON PREPARATION AND COORDINATION.
W71-10287 06E

THE DETERMINATION OF POWER BENEFITS FROM A MULTIPURPOSE WATER PROJECT,
W71-10383 06B

PROJECTS
COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT.
W71-10284 06E

PROTOTHECA
THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
W71-10090 05C

PROTOZOA
REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
W71-09987 05C

PUBLIC HEALTH
THE HEALTH EFFECTS OF NITRATES IN WATER (PANEL DISCUSSION),
W71-09957 05B

FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE

SCHISTOSOMIASIS CONTROL PILOT PROJECT EGYPT 89,
W71-00008 05A

WATER POLLUTION CONTROL ACT.
W71-10068 06E

WATER POLLUTION--PROTECTION FROM.
W71-10071 06E

PUBLIC HEALTH--POLLUTION OF WATER SUPPLY PROSCRIBED.
W71-10078 06E

MERCURY POLLUTION INTEREST IN IT NOW ON THE UPSWING,
W71-10088 05C

ENVIRONMENTAL LAW NEW LEGAL CONCEPTS IN THE ANTIPOLLUTION FIGHT,
W71-10118 05G

MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
W71-10206 05C

VILLAGE SAFE WATER ACT.
W71-10226 06E

STATE BOARD OF HEALTH.
W71-10233 06E

POWER OVER WATER POLLUTION CONTROL AND PENALTY FOR POISONING OF WATERS.
W71-10296 06E

SANITARY CONTROL OF SHELLFISH.
W71-10360 06E

FURNISHING POTABLE WATER.
W71-10435 06F

MINIMUM STANDARDS OF SANITATION AND HEALTH PROTECTION MEASURES.
W71-10437 06F

WATER POLLUTION IN GENERAL.
W71-10483 06E

HEALTH MENACES.
W71-10487 06E

PUBLIC NUISANCE
NUISANCE (WATER POLLUTION).
W71-10078 06E

HEALTH MENACES.
W71-10487 06E

PUBLIC RIGHTS
ENVIRONMENTAL LAW NEW LEGAL CONCEPTS IN THE ANTIPOLLUTION FIGHT,
W71-10118 05G

PUBLICATIONS
SEDIMENTATION--ANNOTATED BIBLIOGRAPHY OF FOREIGN LITERATURE FOR 1968 AND 1969, SURVEY NO. 6,
W71-10038 02J

PUGET PEAK(ALASKA)
PUGET PEAK AVALANCHE, ALASKA.
W71-10335 02J

PUMP TESTING
CHARTS SHOW AIR-LIFT PERFORMANCE.
W71-10438 08A

QUALITY CONTROL
IMPLEMENTATION OF NATIONAL ENVIRONMENTAL POLICY.
W71-10285 06E

RADIOACTIVE WASTES
LICENSING OF PRODUCTION AND UTILIZATION FACILITIES (NUCLEAR POWER REACTORS).
W71-10286 06E

RADIOISOTOPES
AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

RAIN GAGES
CALCULATING PRECIPITATION IN WATER BALANCE ESTIMATES (UCHET OSADKOV PRI VODNOBALANSOVYKH RASCHETAKH).
W71-10346 02B

PRECIPITATION ADJUSTMENTS FOR RAIN-GAGE BUCKET WETTING (K VOPROSU O POPRAVKAKH K OSADKAM NA SMACHIVANIYE VEDRA),
W71-10348 02B

RAINFALL
PARAMETER ESTIMATION FOR WET-DAY SEQUENCES,
W71-10023 02B

A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
W71-10319 02B

RAINFALL AUGMENTATION
HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
W71-10179 03B

RAINFALL DISPOSITION
A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
W71-10015 02B

RAINFALL-RUNOFF RELATIONS
DESIGN FOR FEEDLOT WASTE MANAGEMENT - HISTORY AND CHARACTERISTICS,
W71-10371 05G

RAINFALL-RUNOFF RELATIONSHIPS
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10018 02A

A RUNOFF POTENTIAL RATING TABLE FOR SOILS,
W71-10016 02G

ESTIMATION OF SURFACE WTER LAG TIME FROM THE KINEMATIC WAVE EQUATIONS,
W71-10022 02E

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

CROSS SPECTRAL ANALYSIS OF PRECIPITATION AND STREAMFLOW DATA SYSTEMS,
W71-10037 07C

STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
W71-10172 02A

HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
W71-10179 03B

PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
W71-10180 04A

A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAIKAL BASED ON PRECIPITATION (RUSSIAN PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
W71-10181 04A

CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORRENTSII),
W71-10184 04A

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I VLAGI),
W71-10188 02D

STORM FLOOD FORMATION PROCESSES (RUSSIAN PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
W71-10189 02E

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10345 04A

REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
W71-10369 05G

CATTLE FEEDLOT WATER QUALITY HYDROLOGY,
W71-10373 05G

RAPID DRAWDOWN
PHREATIC SURFACE LOCATION AFTER DRAWDOWN,
W71-10390 08D

REAERATION
REAERATION OF STREAMS AND RESERVOIRS ANALYSIS AND BIBLIOGRAPHY,
W71-10202 05G

WATER POLLUTION AND SELF-PURIFICATION STUDY ON THE PO RIVER BELOW FERRARA,
W71-10324 05B

REARING AREAS
COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

RECLAIMED WATER
WATER RECLAMATION.
W71-10127 06E

RECREATION
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

PLANNING ANALYSIS FOR THE NON-MARKET VALUES OF WATER RESOURCES WITH PARTICULAR EMPHASIS ON RECREATION,
W71-09944 06B

RECREATION DEMANDS
PLANNING ANALYSIS FOR THE NON-MARKET VALUES OF WATER RESOURCES WITH PARTICULAR EMPHASIS ON RECREATION,
W71-09944 06B

RECREATION FACILITIES
STATE MARINE BOARD.
W71-10246 06E

REFUSE ACT
ADMINISTRATIVE PROCEDURE (PERMITS FOR DISCHARGES OR DEPOSITS INTO NAVIGABLE WATERS).
W71-10135 06E

REGIONAL ANALYSIS
ANNUAL, SEASONAL, AND MONTHLY CHANGES IN RUNOFF IN THE UNITED STATES,
W71-10029 02E

REGULATION
OCEAN WATER-CONTACT SPORTS.
W71-09935 06E

GRANTS FOR WATER POLLUTION CONTROL.
W71-09939 06E

A DYNAMIC PROGRAMMING ALGORITHM FOR THE OPERATION OF THE GREAT LAKES,
W71-10076 06B

STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
W71-10103 05C

WATER QUALITY STANDARDS FOR INTERSTATE WATERS,
W71-10160 05G

BY-PASSING OF SEWAGE, INDUSTRIAL, AND OTHER WASTE TREATMENT PLANTS AND EMERGENCY, ACCIDENTAL, OR OTHER EXCESSIVE SPILLS AND DISCHARGES OF SEWAGE, INDUSTRIAL OR OTHER WASTES.
W71-10167 05G

COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

INSTALLATION AND OPERATION OF SEPTIC TANK SEWAGE DISPOSAL SYSTEMS,
W71-10256 05D

PESTICIDE POLLUTION,
W71-10264 05G

THE TEXAS WATER QUALITY BOARD,
W71-10265 05G

MINE DRAINAGE.
W71-10277 06E

SPECIAL REGULATIONS.
W71-10278 06E

REGULATIONS FOR PUBLIC WATER SUPPLIES.
W71-10279 06E

SALE OF SHELLFISH FROM POLLUTED AREAS.
W71-10436 06E

POLLUTING WATER.
W71-10449 06E

REGULATIONS
CHICAGO SANITARY DISTRICT--POLLUTION CONTROL.
W71-10281 06E

REMEDIES
NUISANCE (WATER POLLUTION).
W71-10078 06E

RESEARCH AND DEVELOPMENT
DISCHARGES OF OIL FOR RESEARCH, DEVELOPMENT AND DEMONSTRATION PURPOSES.
W71-10134 06E

RESEARCH FACILITIES
BUILDING AND OPERATING A FLOATING LABORATORY,
W71-09986 09C

RESERVOIR OPERATION
OKLAHOMA WATER LAW, STREAM AND SURFACE, THE WATER CONSERVATION STORAGE COMMISSION AND THE 1965 AND 1967 AMENDMENTS,
W71-10215 06E

RESERVOIR SITES
ACT AUTHORIZING MUNICIPAL CORPORATIONS TO PURCHASE OR CONDEMN LAND FOR WATERWORKS AND THE PROTECTION THEREOF FROM POLLUTION.
W71-10242 06F

RESERVOIR SURVEYS
CHAPTER III. SEDIMENT MEASUREMENT TECHNIQUES3 RESERVOIR DEPOSITS.
W71-10392 07B

RESERVOIRS
SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
W71-09946 05B

DEVELOPMENT OF PHYSICO-CHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS PRECEDING SUMMER STAGNATION IN A RESERVOIR (IN FRENCH),
W71-10087 05C

REAERATION OF STREAMS AND RESERVOIRS ANALYSIS AND BIBLIOGRAPHY,
W71-10202 05G

A SHORT-TERM FORECAST OF INFLOW TO THE RESERVOIR OF THE ZEYSKAYA HYDROELECTRIC POWER PLANT (KRATKOSROCHNYY PROGNOZ PRITOCHNOSTI V VODOKHRANILISHCHE ZEYSKOY GES),
W71-10347 04A

CHAPTER III. SEDIMENT MEASUREMENT TECHNIQUES3 RESERVOIR DEPOSITS.
W71-10392 07B

RESISTANCE
LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS,
W71-10084 05C

RESOURCE DEVELOPMENT
OKLAHOMA RESOURCES DEVELOPMENT ACT OF 1965.
W71-10244 06E

RESPIRATION
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

REVERSE OSMOSIS
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

REVIEWS
INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
W71-09945 04A

MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
W71-09989 05C

PESTICIDES IN THE MARINE ENVIRONMENT,
W71-09992 05C

MEASURING EVAPOTRANSPIRATION A REVIEW,
W71-10013 02D

REYNOLDS NUMBER
ANALYSIS OF SEDIMENTATION DATA,
W71-10315 02J

RICE
WHITE V EDGERLY PETROLEUM CO (POLLUTION OF RICE CROP BY SALINE WATER FROM OIL WELL).
W71-10205 06F

RIFFLE BENTHOS
ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (WITH GERMAN SUMMARY),
W71-10064 05C

RIPPLE MARKS
FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
W71-10173 08B

RIVER FLOW
NAVIGATION CONDITIONS AT MILLERS FERRY LOCK AND DAM, ALABAMA RIVER, ALABAMA. HYDRAULIC MODEL INVESTIGATION,
W71-09999 08B

NAVIGATION CONDITIONS AT MCALPINE LOCKS AND DAM, OHIO RIVER. HYDRAULIC MODEL INVESTIGATION,
W71-10005 08B

NAVIGATION CONDITIONS AT COLUMBIA LOCK AND DAM, OUACHITA RIVER LOUISANA,
W71-10006 08B

RIVER SYSTEMS
A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
W71-10185 02E

RIVER TRAINING
CERTAIN ASPECTS OF THE INFLUENCE ON THE HYDPOLOGIC REGIME OF HYDRAULIC WORKS FOR THE IMPROVEMENT OF NAVIGATION IN THE DANUBE DELTA (FRENCH CERTAINS APSECTS DE L'INFLUENCE SUR LE REGIME HYDROLOGIQUE DES TRAVAUX HYDRAULIQUES EFFECTUES POUR L'AMELIORATION DE LA NAVIGATION DANS LE DELTA DU DANUBE),
W71-10058 08B

THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (FRENCH L'INFLUENCE DES TRAVAUX D'AMENAGEMENT SUR LA MORPHOLOGIE DES BRAS DU DELTA DU DANUBE),
W71-10059 08B

STUDIES OF THE DISPOSITION OF PARTIAL DISCHARGES OF BED LOAD UPSTREAM OF THE SULINA MOUTH (FRENCH ETUDES DES DISPOSITIFS DE DECHARGEMENT PARTIEL DU DEBIT SOLIDE EN AMONT DE L'EMBOUCHURE DE SULINA),
W71-10060 08B

RIVERS
THE LAWS OF ICE PROCESSES IN DELTAS,
W71-10042 02C

CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORREKTSII),
W71-10184 04A

MORPHOLOGICAL CHARACTERISTICS OF BRAIDED RIVER CHANNELS IN AN AREA OF TRIBUTARY INFLOW (K VOPROSU O MORFOLOGICHESKIKH

OSOBENNOSTYAKH MNOGORUKAVNYKH RECHNYKH RUSEL NA UCHASTKE VPADENIYA PRITOKA),
W71-10343 02J

RIVERS AND HARBORS ACT
BASS ANGLERS SPORTSMAN'S SOC'Y V US PLYWOOD-CHAMPION PAPERS, INC (PRIVATE PARTY HAS NO FIGHT TO ENFORCE ANTI-POLLUTION PROVISION OF RIVERS AND HARBORS ACT).
W71-10150 06E

ROCK FILLS
A THEORY FOR THE SHEAR STRENGTH OF ROCKFILL,
W71-10403 08D

ROCK MECHANICS
PROBLEMS WITH LARGE UNDERGROUND STATIONS IN ITALY,
W71-10402 08C

THE MEASUREMENT OF ROCK STRESS CHANGES USING HYDRAULIC BOREHOLE GAGES,
W71-10408 08E

ROCKFILL DAMS
FIELD SOLUTIONS FOR TURBULENT SEEPAGE FLOW,
W71-10394 08D

ROCKSLIDES
PUGET PEAK AVALANCHE, ALASKA.
W71-10335 02J

ROUTING
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10018 02A

ESTIMATION OF SURFACE WTER LAG TIME FROM THE KINEMATIC WAVE EQUATIONS,
W71-10022 02E

RSFSR
MUD FLOW OCCURRENCES IN THE RSFSR (RASPROSTRANENIYE SELEY NA TERRITORII RSFSR),
W71-10351 02J

RUMINANTS
VALUE OF PROCCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

RUNOFF
ANNUAL, SEASONAL, AND MONTHLY CHANGES IN RUNOFF IN THE UNITED STATES,
W71-10029 02E

POLLUTION POTENTIAL OF LIVESTOCK FEEDING OPERATIONS IN SOUTH DAKOTA,
W71-10108 05D

FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORREKTSII),
W71-10184 04A

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I VLAGI),
W71-10188 02D

A STORM FLOOD HYDROGRAPH FORECAST FOR RIVERS ON THE MARITIME TERRITORY FROM RUNOFF OF REPRESENTATIVE BASINS (METODIKA PROGNOZA GIDROGRAFA DOZHDEVYKH PAVODKOV REK PRIMOR'YA NA OSNOVE UCHETA STOKA POKAZATEL'NYKH BASSEYNOV),
W71-10344 04A

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10345 04A

A SHORT-TERM FORECAST OF INFLOW TO THE RESERVOIR OF THE ZEYSKAYA HYDROELECTRIC POWER PLANT (KRATKOSROCHNYY PROGNOZ PRITOCHNOSTI V VODOKHRANILISHCHE ZEYSKOY GES),
W71-10347 04A

VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (IZMENCHIVOST' VNUTRIGODOVOGO RASPREDELENIYA STOKA REK VOSTOCHNOGO ZAKAVKAZ'YA),
W71-10350 02E

ANIMAL WASTE RUNOFF - A MAJOR WATER QUALITY CHALLENGE,
W71-10367 05G

RUNOFF FORECASTING
A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
W71-10015 02B

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAYKAL BASED ON PRECIPITATION (RUSSIAN PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
W71-10181 04A

CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN K RASCHETU VODNOGO BALANSA OZ. KHANKA),
W71-10186 02H

STORM FLOOD FORMATION PROCESSES (RUSSIAN PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
W71-10189 02E

RUNOFF POTENTIAL(SOILS)
A RUNOFF POTENTIAL RATING TABLE FOR SOILS,
W71-10016 02G

SAFETY FACTORS
DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

SALINE WATER
WHITE V EDGERLY PETROLEUM CO (POLLUTION OF RICE CROP BY SALINE WATER FROM OIL WELL).
W71-10205 06E

POLLUTION AND ATTENDANT PROBLEMS,
W71-10261 05G

SALINE WATER INTRUSION
OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL(FRENCH DONNEES SUR LES CHARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
W71-10046 02K

HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
W71-10050 02L

A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 08B

WHITE V EDGERLY PETROLEUM CO (POLLUTION OF RICE CROP BY SALINE WATER FROM OIL WELL).
W71-10205 06E

SALINE WATER SYSTEMS
NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
W71-09974 01B

SALINE WATER-FRESHWATER INTERFACES
OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

CORPORATIONS TO STORE SALT WATER,
W71-10097 06E

SALINITY
TIME VARIATION OF THE DEPTH OF A HIGH SALINITY LAYER IN THE CELTIC SEA,
W71-09949 02K

HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
W71-09991 05C

SALMONIDS
COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

SALTS
HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
W71-09991 05C

SAN FRANCISCO BAY
WATER QUALITY MODELING OF ESTUARIES,
W71-10047 05G

SAN JACINTO RIVER(CALIF)
FLOOD PLAIN INFORMATION, SAN JACINTO RIVER (SAN JACINTO TO RAILROAD CANYON), RIVERSIDE COUNTY, CALIFORNIA.
W71-09973 04A

SAND DUNES
WIND-ORIENTED GASTROPOD SHELLS AS INDICATORS OF PALEOWIND DIRECTION,
W71-10330 02J

SANDS
BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

TECHNIQUE FOR STUDY OF GRANDULAR MATERIALS,
W71-10405 08D

SANITARY ENGINEERING
VILLAGE SAFE WATER ACT.
W71-10226 06E

SCALLOPS
AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE

AGENTS,
W71-10211 05C

SCANDIUM
DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
W71-10072 07B

SCHISTOSOMIASIS
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

SCOUR
TENTATIVE LABORATORY INVESTIGATION OF DIVAGATING-RIVER BANK DESTRUCTION (RUSSIAN OPYT ISSLEDOVANIYA V LABORATORNYKH USLOVIYAKH RAZRUSHENIYA BEREGOV (DEYGISHA) NA BLUZHDAYUSHCHIKH REKAKH),
W71-09971 02J

PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
W71-10175 08A

SEA WATER
SILICATE-SEA WATER EQUILIBRIA IN THE OCEAN SYSTEM,
W71-09948 02K

TIME VARIATION OF THE DEPTH OF A HIGH SALINITY LAYER IN THE CELTIC SEA,
W71-09949 02K

LONG-TIME DURABILITY OF CONCRETE IN SEAWATER,
W71-10380 08F

SEDIMENT CONTROL
A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 08B

STUDIES OF THE DISPOSITION OF PARTIAL DISCHARGES OF BED LOAD UPSTREAM OF THE SULINA MOUTH (FRENCH ETUDES DES DISPOSITIFS DE DECHARGEMENT PARTIEL DU DEBIT SOLIDE EN AMONT DE L'EMBOUCHURE DE SULINA),
W71-10060 08B

SEDIMENT DEPOSITS
CHAPTER III. SEDIMENT MEASUREMENT TECHNIQUES3 RESERVOIR DEPOSITS.
W71-10392 07B

SEDIMENT DISCHARGE
CALCULATION OF THE MEAN ANNUAL DISCHARGE OF SUSPENDED SEDIMENTS AND ITS CYCLIC FLUCTUATIONS (RUSSIAN OPREDELENIYE NORMY I TSIKLICHESKIKH KOLEBANIY GODOVOGO STOKA VZVESHENNYKH NANOSOV),
W71-09964 02J

SEDIMENT DISCHARGE OF RIVERS IN THE MARITIME TERRITORY (RUSSIAN STOK NANOSOV REK PRIMORSKOGO KRAYA),
W71-09965 02J

RESULTS OF FIELD INVESTIGATIONS AND CALCULATION OF BED-LOAD DISCHARGE OF THE MZYMTA RIVER (RUSSIAN REZUL'TATY POLEVYKH ISSLEDOVANIY I RASCHET STOKA VLEKOMYKH NANOSOV R. MZYMTY),
W71-09968 02J

THE MOVEMENT OF BOTTOM SEDIMENTS (RUSSIAN DVIZHENIYE DONNYKH NANOSOV),
W71-09969 02J

SEDIMENT LOAD
CALCULATION OF COARSE ALLUVIUM DISCHARGE (SANDS) FROM THE SULINA ARM (FRENCH CALCUL DE L'ECOULEMENT DES ALLUVIONS GROSSIERES (SABLES) A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10044 02J

SEDIMENT SAMPLING
CHAPTER III. SEDIMENT MEASUREMENT TECHNIQUES3 RESERVOIR DEPOSITS.
W71-10392 07B

SEDIMENT TRANSPORT
RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (RUSSIAN NEKOTORYYE REZUL'TATY LABORATORNYKH ISSLEDOVANIY SKOROSTEY DVIZHENIYA DONNYKJ NANOSOV),
W71-09967 02J

THE MOVEMENT OF BOTTOM SEDIMENTS (RUSSIAN DVIZHENIYE DONNYKH NANOSOV),
W71-09969 02J

TENTATIVE LABORATORY INVESTIGATION OF DIVAGATING-RIVER BANK DESTRUCTION (RUSSIAN OPYT ISSLEDOVANIYA V LABORATORNYKH USLOVIYAKH RAZRUSHENIYA BEREGOV (DEYGISHA) NA BLUZHDAYUSHCHIKH REKAKH),
W71-09971 02J

THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (FRENCH L'INFLUENCE DES TRAVAUX D'AMENAGEMENT SUR LA MORPHOLOGIE DES BRAS DU DELTA DU DANUBE),
W71-10059 08B

LONGITUDINAL DISPERSION OF BED-MATERIAL PARTICLES,
W71-10169 02J

DEPOSITION OF DEEP-SEA SANDS COMPARISON OF TWO AREAS OF THE CAROLINA CONTINENTAL RISE,
W71-10328 02J

DURABILITIES OF SAND SIZE SCHIST AND 'VOLCANIC' ROCK FRAGMENTS DURING FLUVIAL TRANSPORT, ELK CREEK, BLACK HILLS, SOUTH DAKOTA,
W71-10329 02J

WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (ROSSYPI SLOYA VOLNOVOGO PERERABOTKI I IKH GENETICHESKIYE OSOBENNOSTI),
W71-10340 02J

ABSENCE OF DOWNSTREAM TRANSPORT OF ALLUVIUM BY DOWNCUTTING RIVERS, AS ILLUSTRATED BY THE GAR' RIVER (OTSUTSTVIYE PRODOL'NOGO PERENOSA ALLYUVIYA VREZAYUSHCHEYSYA REKI NA PRIMERE R. GAR'),
W71-10352 02J

SEDIMENTARY STRUCTURES
WIND-ORIENTED GASTROPOD SHELLS AS INDICATORS OF PALEOWIND DIRECTION,
W71-10330 02J

BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

STREAM BANK FAILURE AND ROTATIONAL SLUMPING PRESERVATION AND SIGNIFICANCE IN THE GEOLOGIC RECORD,
W71-10334 02J

SEDIMENTATION
CHANNEL PIRACY ON MONTEREY DEEP-SEA FAN,
W71-09947 02J

PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (RUSSIAN FOTOGRAFICHESKIY METOD GRANULOMETRICHESKOGO ANALIZA KRUPNYKH NANOSOV),
W71-09966 02J

DYNAMICS OF THE ILI RIVER DELTA (RUSSIAN DINAMIKA DEL'TY REKI ILI),
W71-09970 02J

SEDIMENTATION--ANNOTATED BIBLIOGRAPHY OF FOREIGN LITERATURE FOR 1968 AND 1969, SURVEY NO. 6,
W71-10034 02J

METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
W71-10045 02L

ANALYSIS OF SEDIMENTATION DATA,
W71-10315 02J

DEPOSITION OF DEEP-SEA SANDS COMPARISON OF TWO AREAS OF THE CAROLINA CONTINENTAL RISE,
W71-10328 02J

ADSORPTION AND THE RELIABILITY OF TRACE ELEMENTS AS ENVIRONMENT INDICATORS FOR SHALES,
W71-10333 02G

BIOCLASTIC TURBIDITE SEDIMENTATION IN COLUMBUS BASIN, BAHAMAS,
W71-10336 02J

SEDIMENTATION BIBLIOGRAPHY
SEDIMENTATION--ANNOTATED BIBLIOGRAPHY OF FOREIGN LITERATURE FOR 1968 AND 1969, SURVEY NO. 6,
W71-10034 02J

SEDIMENTATION DATA
ANALYSIS OF SEDIMENTATION DATA,
W71-10315 02J

SEDIMENTATION SURVEYS
CHAPTER III. SEDIMENT MEASUREMENT TECHNIQUES3 RESERVOIR DEPOSITS.
W71-10392 07B

SEDIMENTS
CALCULATION OF THE MEAN ANNUAL DISCHARGE OF SUSPENDED SEDIMENTS AND ITS CYCLIC FLUCTUATIONS (RUSSIAN OPREDELENIYE NORMY I TSIKLICHESKIKH KOLEBANIY GODOVOGO STOKA VZVESHENNYKH NANOSOV),
W71-09964 02J

RESULTS OF FIELD INVESTIGATIONS AND CALCULATION OF BED-LOAD DISCHARGE OF THE MZYMTA RIVER (RUSSIAN REZUL'TATY POLEVYKH ISSLEDOVANIY I RASCHET STOKA VLEKOMYKH NANOSOV R. MZYMTY),
W71-09968 02J

DYNAMICS OF THE ILI RIVER DELTA (RUSSIAN DINAMIKA DEL'TY REKI ILI),
W71-09970 02J

ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

PARTICLE SIZE, WATER-STABLE AGGREGATES, AND BACTERIAL POPULATIONS IN LAKE SEDIMENTS,
W71-10069 05C

RECENT AND POSTGLACIAL PRODUCTION RATES OF A MARL LAKE,
W71-10080 05C

A REVIEW OF STUDIES ON THE BOTTOM SEDIMENTS OF LAKES (IN POLISH),
W71-10095 05C

PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,

W71-10207 05C

WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (ROSSYPI SLOYA VOLNOVOY PERERABOTKI I IKH GENETICHESKIYE OSOBENNOSTI).
W71-10340 02J

CHAPTER III. SEDIMENT MEASUREMENT TECHNIQUES3 RESERVOIR DEPOSITS.
W71-10392 07B

SEDIMENT-WATER INTERFACES
MUD FLOW OCCURRENCES IN THE RSFSR (RASPROSTRANENIYE SELEY NA TERRITORII RSFSR),
W71-10351 02J

SEEPAGE
VERTICAL RECHARGE OF UNCONFINED AQUIFER,
W71-10176 02G

FIELD SOLUTIONS FOR TURBULENT SEEPAGE FLOW,
W71-10394 08D

A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
W71-10415 04A

SEISMIC INVESTIGATIONS
ESTIMATING STORAGE CAPACITY IN DEEP ALLUVIUM BY GRAVITY-SEISMIC METHODS,
W71-10384 02F

SELF-PURIFICATION
WATER POLLUTION AND SELF-PURIFICATION STUDY ON THE PO RIVER BELOW FERRARA,
W71-10328 05B

SEMIPERMEABLE MEMBRANES
SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

SEPTIC TANKS
INSTALLATION AND OPERATION OF SEPTIC TANK SEWAGE DISPOSAL SYSTEMS,
W71-10256 05D

SETTLEMENT(STRUCTURAL)
DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

SETTLING VELOCITY
ANALYSIS OF SEDIMENTATION DATA,
W71-10315 02J

SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
W71-10332 02J

SEWAGE
AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

ADOPTION OF ORDINANCES BY SANITARY DISTRICTS,
W71-10152 06E

CITY OF SPRINGFIELD V NORTH FORK OUTLET DRAINAGE DIST (PREVENTING DRAINAGE DISTRICT FROM STRAIGHTENING RIVER).
W71-10203 06E

COOK V CITY OF DU QUOIN (CITY'S LIABILITY FOR POLLUTION OF STREAM).
W71-10204 06E

WATER AND SEWAGE.
W71-10442 06E

SEWAGE BACTERIA
METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

SEWAGE DISPOSAL
PEYTON V HAMMER (NO PRESCRIPTIVE RIGHT TO POLLUTE STREAM).
W71-10154 06F

FREEDMAN V BOROUGH OF WEST HAZELTON (PUBLIC NUISANCE CAUSED BY DISCHARGE OF SEWAGE INTO DITCH).
W71-10197 06E

WATER QUALITY STANDARDS.
W71-10299 06E

AUTO CLUB OF ST PAUL V CITY OF WHITE BEAR LAKE (RIGHT OF CITY TO CONSTRUCT SEWAGE OUTLET INTO LAKE).
W71-10311 06E

WATER AND SEWAGE.
W71-10442 06E

SEWAGE DISTRICTS
ADOPTION OF ORDINANCES BY SANITARY DISTRICTS,
W71-10152 06E

SEWAGE ORGANISMS
METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

SEWAGE TREATMENT
MARINE TOILET REGULATIONS,
W71-10158 05G

WATER SUPPLY AND SEWAGE.
W71-10248 06E

WATER POLLUTION ABATEMENT,
W71-10252 06E

INSTALLATION AND OPERATION OF SEPTIC TANK SEWAGE DISPOSAL SYSTEMS,
W71-10256 05D

METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

SEWERS
SPECIAL WATER QUALITY PROVISIONS.
W71-10129 06E

CITY OF HIGHLAND V AUER (CITY'S LIABILITY FOR PERMITTING RESIDENTS TO POLLUTE ITS SEWERS).
W71-10198 06E

SHALES
ADSORPTION AND THE RELIABILITY OF TRACE ELEMENTS AS ENVIRONMENT INDICATORS FOR SHALES,
W71-10333 02G

SHEAR STRENGTH
A THEORY FOR THE SHEAR STRENGTH OF ROCKFILL,
W71-10403 08D

SHELLFISH
SANITARY CONTROL OF SHELLFISH.
W71-10360 06E

SALE OF SHELLFISH FROM POLLUTED AREAS.
W71-10436 06E

SHORES
WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (ROSSYPI SLOYA VOLNOVOY PERERABOTKI I IKH GENETICHESKIYE OSOBENNOSTI).
W71-10340 02J

SHRIMP
LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS,
W71-10084 05C

SIBERIA
PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPPOSY PROGNOZOV I RASCHETOV STOKA REK).
W71-10180 04A

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I VLAGI).
W71-10188 02D

PRECIPITATION ADJUSTMENTS FOR RAIN-GAGE BUCKET WETTING (K VOPROSU O POPRAVKAKH K OSADKAM NA SMACHIVANIYE VEDRA).
W71-10348 02B

SILICATES
SILICATE-SEA WATER EQUILIBRIA IN THE OCEAN SYSTEM,
W71-09948 02K

SILICATE-SEA WATER REACTIONS
SILICATE-SEA WATER EQUILIBRIA IN THE OCEAN SYSTEM,
W71-09948 02K

SIMULATION
THE DETERMINATION OF POWER BENEFITS FROM A MULTIPURPOSE WATER PROJECT,
W71-10383 06B

SIMULATION ANALYSIS
FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
W71-10174 08B

HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
W71-10179 03B

REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
W71-10320 04A

GENERATED MONTHLY STREAMFLOWS FOR THE MIDWESTERN AND SOUTHWESTERN UNITED STATES,
W71-10321 02E

SIMULATION MODEL OF STREAM CAPTURE,
W71-10337 02E

SIPHONOPHORES
TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

SLOPE STABILITY
SEEPAGE FORCE ON INTERFACIAL BED PARTICLES,
W71-09943 02J

LIMIT ANALYSIS OF STABILITY OF SLOPES,
W71-10393 08D

FIELD SOLUTIONS FOR TURBULENT SEEPAGE FLOW,
W71-10394 08B

SLOPES
LIMIT ANALYSIS OF STABILITY OF SLOPES,
W71-10393 08D

SLUICES
LIABILITY FOR THE FLOODING OF MINE WASTES UPON ANOTHER'S PROPERTY.
W71-10310 06E

SLUMPING
STREAM BANK FAILURE AND ROTATIONAL SLUMPING PRESERVATION AND SIGNIFICANCE IN THE GEOLOGIC RECORD,
W71-10334 02J

SNAIL CONTROL
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

SNAILS
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE AGENTS,
W71-10211 05C

SNOWPACKS
MUD FLOW OCCURRENCES IN THE RSFSR (RASPROSTRANENIYE SELEY NA TERRITORII RSFSR),
W71-10351 02J

SOCIAL ASPECTS
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

ENVIRONMENTAL LAW NEW LEGAL CONCEPTS IN THE ANTIPOLLUTION FIGHT,
W71-10118 05G

SOIL CLASSIFICATIONS
A RUNOFF POTENTIAL RATING TABLE FOR SOILS,
W71-10016 02G

SOIL COMPACTION
THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
W71-10032 08D

SOIL ENGINEERING
THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
W71-10032 08D

SOIL FORMATION
THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
W71-10031 02G

SOIL MECHANICS
THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
W71-10032 08D

TECHNIQUE FOR STUDY OF GRANULAR MATERIALS,
W71-10405 08D

DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

SOIL MOISTURE
AN ELECTROMETRIC METHOD FOR THE DETERMINATION OF SOIL MOISTURE,
W71-10012 02G

SOIL MOISTURE METERS
NONDESTRUCTIVE WATER CONTENT DETERMINATION,
W71-10338 02G

SOIL MOISTURE MOVEMENT
SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
W71-10387 03F

SOIL MOSITURE METERS
AN ELECTROMETRIC METHOD FOR THE DETERMINATION OF SOIL MOISTURE,
W71-10012 02G

SOIL SEALANTS
LABORATORY EVALUATIONS OF CANAL SOIL SEALANTS. AN OPEN AND CLOSED CONDUIT SYSTEMS INVESTIGATION OF FOUR PROPRIETARY MATERIALS PROPOSED AS CANAL SOIL SEALANTS ON SILTY SAND IN LABORATORY PERMEAMETERS,
W71-10201 08D

A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
W71-10415 04A

SOIL TESTS
CAPACITANCE TECHNIQUES FOR RADIAL DEFORMATIONS,
W71-10407 08D

SOIL WATER
NONDESTRUCTIVE WATER CONTENT DETERMINATION,
W71-10338 02G

SOIL WATER MOVEMENT
AUGER HOLE SEEPAGE THEORY,
W71-10011 02G

A RUNOFF POTENTIAL RATING TABLE FOR SOILS,
W71-10016 02G

VERTICAL RECHARGE OF UNCONFINED AQUIFER,
W71-10176 02G

VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
W71-10318 02F

TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

SOIL-PORE CLOGGING
SOIL CHEMICAL CHANGES AND INFILTRATION RATE REDUCTION UNDER SEWAGE SPREADING,
W71-10108 05B

SOIL-WATER-PLANT RELATIONSHIPS
PAHRUMP FIELD LABORATORY,
W71-10414 03F

SOLID WASTES
SOLID WASTE DISPOSAL ACT.
W71-10228 06E

SOLUBILITY
SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
W71-10070 05C

SOUTH DAKOTA
POLLUTION POTENTIAL OF LIVESTOCK FEEDING OPERATIONS IN SOUTH DAKOTA,
W71-10104 05D

INTRUSION AND POLLUTION OF WATER--RELATIONSHIPS WITH GAS AND OIL.
W71-10250 06E

POWER OVER WATER POLLUTION CONTROL AND PENALTY FOR POISONING OF WATERS.
W71-10296 06E

TAX INCENTIVE FOR COMPLIANCE WITH WATER POLLUTION LAWS AND STANDARDS.
W71-10297 06E

SOVIET RESEARCH
THERMAL INTERACTION OF THE ATMOSPHERE AND THE HYDROSPHERE IN THE ARTIC (RUSSIAN TEPLOVOYE VZAIMODEYSTVIYE ATMOSFERY I GIDROSFERY V ARKTIKE),
W71-09962 02C

SPARTIAL ALLOCATION
PLANNING ANALYSIS FOR THE NON-MARKET VALUES OF WATER RESOURCES WITH PARTICULAR EMPHASIS ON RECREATION,
W71-09944 06B

SPAWNING AREAS
COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

SPECIFIC RETENTION
VARIATION OF SPECIFIC RETENTION IN RUBBLY ROCK PARTICLES,
W71-10019 02F

SPECIFICATIONS
BETTER SPECIFICATIONS FOR UNDERGROUND WORK,
W71-10401 06B

SPECTROPHOTOMETRY
LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

SPECTROSCOPY
DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
W71-10072 07B

STABILITY ANALYSIS
LIMIT ANALYSIS OF STABILITY OF SLOPES,
W71-10393 08D

STAGE GOVERNMENTS
FORTY YEARS OF WATER POLLUTION CONTROL IN WISCONSIN A CASE STUDY,
W71-10275 05G

STAGE-DISCHARGE RELATIONS
HYDRAULIC CALCULATION OF WATER DISCHARGE AND LEVELS IN RIVER DELTAS,
W71-10038 02E

DESIGN LEVELS IN THE TRANSITION ZONE BETWEEN THE TIDAL REACH AND THE RIVER REGIME REACH,
W71-10039 08B

ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
W71-10040 02E

STANDARDS
SOLID WASTE DISPOSAL STANDARDS.
W71-10114 05G

BASIN REGULATIONS--WATER QUALITY (WATER QUALITY STANDARDS,

ABATEMENT, AND ENFORCEMENT PROCEDURES).
W71-10116 05G

WATER QUALITY STANDARDS FOR WATERS OF INDIANA.
W71-10119 05G

STATE WATER QUALITY CONTROL.
W71-10123 06E

STANDARDS OF PERFORMANCE FOR MARINE SANITATION DEVICES.
W71-10136 06F

OPEN PUBLIC HEARING TO DETERMINE WATER QUALITY STANDARDS,
W71-10156 06E

COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

WATER QUALITY STANDARDS FOR INTERSTATE WATERS IN WYOMING.
W71-10214 05G

POWERS AND DUTIES OF BOARD OF HEALTH--SANITARY STANDARDS FOR PROTECTION OF WATER RESOURCES.
W71-10249 06E

STATUS OF WATER QUALITY AND SIGNIFICANT SOURCES OF WASTE WATER DISCHARGES IN MARYLAND.
W71-10254 05G

WATER QUALITY STANDARDS.
W71-10257 05G

WATER QUALITY CRITERIA.
W71-10271 05G

SOME ASPECTS OF THE ALABAMA WATER IMPROVEMENT COMMISSION'S PROGRAM FOR CONTROL OF WATER POLLUTION.
W71-10272 05G

WATER QUALITY STANDARDS.
W71-10299 06E

COLORADO WATER POLLUTION CONTROL ACT OF 1966.
W71-10308 06F

WATER USE CLASSIFICATIONS AND WATER QUALITY STANDARDS.
W71-10312 06E

STANDING CROP
ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (WITH GERMAN SUMMARY),
W71-10064 05C

STATISTICAL ANALYSIS
DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

STATISTICAL METHODS
A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
W71-10015 02B

STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
W71-10172 02A

EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
W71-10318 07A

A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
W71-10319 02B

STATISTICAL MODELS
STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
W71-10172 02A

STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
W71-10317 08B

STATISTICS
SPECIES DIVERSITY SPECIES ABUNDANCE OF FISH POPULATIONS AN EXAMINATION OF VARIOUS METHODS,
W71-10210 07C

STOCHASTIC MODELS
STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
W71-10172 02A

STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
W71-10317 08B

STOCHASTIC PROCESSES
THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
W71-10020 02A

LONGITUDINAL DISPERSION OF BED-MATERIAL PARTICLES,
W71-10169 02J

STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
W71-10172 02A

STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
W71-10317 08B

STORAGE CAPACITY
ESTIMATING STORAGE CAPACITY IN DEEP ALLUVIUM BY GRAVITY-SEISMIC METHODS,
W71-10384 02F

STORAGE COEFFICIENT
PARAMETER ESTIMATION FOR AQUIFER EVALUATION,
W71-10024 02F

PARAMETER ESTIMATION IN HYDROLOGY THE STATE OF THE ART,
W71-10025 02F

STORAGE DEPLETION
AVERAGE WATER TABLE DECLINE,
W71-10417 04B

STORAGE TANKS
REGULATIONS FOR TURBID WATER DISCHARGES AND TO PREVENT INTERMITTENT OR ACCIDENTAL POLLUTION OF WATERS OF THE STATE,
W71-10159 05G

STRATIFIED FLOW
DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL(FRENCH DONNEES SUR LES CHARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

STRATIGRAPHY
REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
W71-10051 02F

BIOCLASTIC TURBIDITE SEDIMENTATION IN COLUMBUS BASIN, BAHAMAS,
W71-10336 02J

STREAM BANK FAILURE
STREAM BANK FAILURE AND ROTATIONAL SLUMPING PRESERVATION AND SIGNIFICANCE IN THE GEOLOGIC RECORD,
W71-10334 02J

STREAM CAPTURE
SIMULATION MODEL OF STREAM CAPTURE,
W71-10337 02E

STREAM EROSION
SEEPAGE FORCE ON INTERFACIAL BED PARTICLES,
W71-09943 02J

STREAM ORDER
NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,
W71-10010 07C

STREAMFLOW
SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
W71-09946 05B

GENERATED MONTHLY STREAMFLOWS FOR THE MIDWESTERN AND SOUTHWESTERN UNITED STATES,
W71-10321 02E

STREAMFLOW FORECASTING
PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPROSY PROGNOZOV I RASCHETOV STOKA REK),
W71-10180 04A

A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
W71-10183 04A

REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
W71-10320 04A

A SHORT-TERM FORECAST OF INFLOW TO THE RESERVOIR OF THE ZEYSKAYA HYDROELECTRIC POWER PLANT (KRATKOSROCHNYY PROGNOZ PRITOCHNOSTI V VODOKHRANILISHCHE ZEYSKOY GES),
W71-10347 04A

STREAMS
ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (WITH GERMAN SUMMARY),
W71-10064 05C

STRESS
THE MEASUREMENT OF ROCK STRESS CHANGES USING HYDRAULIC BOREHOLE GAGES,
W71-10408 08E

STRIP MINE LAKES
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

STRONTIUM
STRONTIUM IN WATER - A BIBLIOGRAPHY.
W71-10192 05B

STRONTIUM RADIOISOTOPES
STRONTIUM IN WATER - A BIBLIOGRAPHY.
W71-10192 05B

STRUCTURAL GEOLOGY
HYDROGEOLOGY OF THE USSR VOLUME 34, THE KARAGANDA OBLAST (RUSSIAN GIDROGEOLOGIYA SSSR TOM XXXIV, KARAGANDINSKAYA OBLAST),
W71-09963 02F

STRUCTURES
PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
W71-10175 08A

SUBMARINE CANYONS

REPOSITION OF DEEP-SEA SANDS COMPARISON OF TWO AREAS OF THE CAROLINA CONTINENTAL RISE,
W71-10328 02J

SUBSIDENCE
DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

SUBSURFACE IRRIGATION
SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
W71-10387 03F

SUBSURFACE WATERS
REGULATIONS FOR PREVENTION OF POLLUTION OF SUBSURFACE WATERS OF THE STATE,
W71-10157 05G

SUPERVISORY CONTROL(POWER)
WATER POLLUTION CONTROL (ALLOCATION OF REGULATORY POWER IN TEXAS),
W71-10263 06E

SURFACE DRAINAGE
CITY OF HIGHLAND V AUER (CITY'S LIABILITY FOR PERMITTING RESIDENTS TO POLLUTE ITS SEWERS).
W71-10198 06E

OKLAHOMA FEED YARDS ACT.
W71-10243 06E

SURFACE WATERS
TWO STAGES IN THE FORMATION OF ICE-LENSES ON FROZEN RIVERS (O DVUKH STADIYAKH FORMIROVANIYA NALEDEY NA PROMERZAYUSHCHIKH REKAKH),
W71-10350 02C

SURFACE-GROUNDWATER RELATIONSHIPS
HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
W71-10050 02L

THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
W71-10053 02F

CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

TWO STAGES IN THE FORMATION OF ICE-LENSES ON FROZEN RIVERS (O DVUKH STADIYAKH FORMIROVANIYA NALEDEY NA PROMERZAYUSHCHIKH REKAKH),
W71-10350 02C

SURFACTANTS
AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE AGENTS,
W71-10211 05C

SURVEYS
EXISTING LEVELS OF NITRATES IN WATERS - THE ILLINOIS SITUATION,
W71-09956 05A

SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
W71-10028 02A

ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
W71-10049 02C

SUSPENDED LOAD
CALCULATION OF THE MEAN ANNUAL DISCHARGE OF SUSPENDED SEDIMENTS AND ITS CYCLIC FLUCTUATIONS (RUSSIAN OPREDELENIYE NORMY I TSIKLICHESKIKH KOLEBANIY GODOVOGO STOKA VZVESHENNYKH NANOSOV),
W71-09964 02J

SEDIMENT DISCHARGE OF RIVERS IN THE MARITIME TERRITORY (RUSSIAN STOK NANOSOV REK PRIMORSKOGO KRAYA),
W71-09965 02J

HYDRAULIC CHARACTERISTICS OF THE HYDROMETRIC SECTION AT THE MOUTH OF THE SULINA ARM (FRENCH CARACTERISTIQUES HYDRAULIQUES DE LA SECTION HYDROMETRIQUE A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10043 02J

CALCULATION OF COARSE ALLUVIUM DISCHARGE (SANDS) FROM THE SULINA ARM (FRENCH CALCUL DE L'ECOULEMENT DES ALLUVIONS GROSSIERES (SABLES) A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10044 02J

SWEAT
'POLYWATER' AND SWEAT SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

SWINE
LABORATORY STUDIES OF AEROBIC STABILIZATION OF SWINE WASTE,
W71-10106 05D

SYNOPTIC ANALYSIS
A STATISTICAL DATA PLAN FOR BOMEX,
W71-10033 02B

SYNTHETIC HYDROLOGY
REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
W71-10320 04A

GENERATED MONTHLY STREAMFLOWS FOR THE MIDWESTERN AND SOUTHWESTERN UNITED STATES,
W71-10321 02E

SYSTEMATICS
A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
W71-10066 05C

SYSTEMS ANALYSIS
AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
W71-09938 06A

PROCESS CONTROL MODEL FOR OXYGEN REGENERATION OF POLLUTED RIVERS, PHASE II,
W71-10162 05G

EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
W71-10314 07A

IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (IDENTIFIKATSIYA NELINEYNYKH GIDROLOGICHESKIKH SISTEM),
W71-10342 02E

TACOMA(WASH)
MODEL STUDY OF POWER INTAKE GATE OF MCNARY DAM,
W71-10168 08C

TAIWAN
GROUND WATER RESOURCES AND DEVELOPMENT COASTAL PLAIN REGION ERH JEN CHI--KAOHSIUNG, TAIWAN,
W71-10163 02F

TAXES
POLLUTION CONTROL FACILITIES--TAX EXEMPTIONS AND CREDITS.
W71-10137 06E

SPECIAL TAX WRITE-OFF FOR POLLUTION CONTROL DEVICES.
W71-10139 06E

TAX RELIEF ON POLLUTION CONTROL FACILITIES.
W71-10148 06E

WASTE TREATMENT FACILITIES.
W71-10239 06E

TAX INCENTIVE FOR COMPLIANCE WITH WATER POLLUTION LAWS AND STANDARDS.
W71-10297 06E

POWERS OF TOWNS--WATER AND LIGHT.
W71-10444 06E

TAXONOMIC GUIDES
TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

TEMPERATURE LOGGING(WELLS)
TEMPERATURE SURVEYS THE ART OF INTERPRETATION,
W71-10427 03B

TEST PROCEDURES
CONCEPT DEVELOPMENT OF A HEAVY DUTY OIL CONTAINMENT SYSTEM FOR USE ON THE HIGH SEAS. VOLUME II. APPENDIX,
W71-10164 05G

TESTS
POWER LOSSES AND FLOW TOPOLOGIES IN CONVERGING MANIFOLD,
W71-10397 08B

TEXAS
SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
W71-09946 05B

CORPORATIONS TO STORE SALT WATER,
W71-10097 06E

BASS ANGLERS SPORTSMAN'S SOC'Y V US PLYWOOD-CHAMPION PAPERS, INC (PRIVATE PARTY HAS NO RIGHT TO ENFORCE ANTI-POLLUTION PROVISION OF RIVERS AND HARBORS ACT).
W71-10150 06E

WATER POLLUTION.
W71-10227 06E

SOLID WASTE DISPOSAL ACT.
W71-10228 06E

INJECTION WELL ACT.
W71-10229 06E

TEXAS WATER QUALITY ACT.
W71-10230 06E

GULF COAST WASTE DISPOSAL AUTHORITY (STATE POLLUTION CONTROL BY REGIONAL AGENCY).
W71-10231 06E

LOCAL AND REGIONAL WATER POLLUTION CONTROL IN TEXAS,
W71-10262 05G

WATER POLLUTION CONTROL (ALLOCATION OF REGULATORY POWER IN TEXAS),
W71-10263 06E

PESTICIDE POLLUTION,
W71-10264 05G

THE TEXAS WATER QUALITY BOARD,
W71-10265 05G

RECURRING TEXAS DROUGHTS,
W71-10410 07C

SALE OF SHELLFISH FROM POLLUTED AREAS.
W71-10436 06E

MINIMUM STANDARDS OF SANITATION AND HEALTH PROTECTION MEASURES.
W71-10437 06E

TEXAS WATER QUALITY ACT
TEXAS WATER QUALITY ACT.
W71-10230 06E

THAWING
HEAT FLOW TO MELTING ICE ON THE USSURI RIVER (TEPLOPRIKHOD K TAYUSHCHEMU L'DU REKI USSURI),
W71-10349 02C

THEORETICAL ANALYSIS
THEORETICAL ANALYSIS OF THE EFFECTS OF AIR VOIDS IN CONCRETE,
W71-10381 08F

THERMAL POLLUTION
EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

SEABADE INDUSTRIES, INC V FLORIDA POWER AND LIGHT CO (CONDEMNING LAND PENDING APPROVAL OF FACILITY BY POLLUTION CONTROL AUTHORITIES).
W71-10303 06E

THERMAL STRESS
EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

THERMAL WATER
REGIONAL DISTRIBUTION OF PH VALUES OF THERMAL SPRINGS OF THE WORLD.
W71-10339 02K

THIN SECTIONS
TECHNIQUE FOR STUDY OF GRANULAR MATERIALS,
W71-10405 08D

TIDAL EFFECTS
ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
W71-10040 02E

TIDES
ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
W71-10040 02E

TIME LAG
ESTIMATION OF SURFACE WTER LAG TIME FROM THE KINEMATIC WAVE EQUATIONS,
W71-10022 02E

TIME SERIES ANALYSIS
ANNUAL, SEASONAL, AND MONTHLY CHANGES IN RUNOFF IN THE UNITED STATES,
W71-10029 02E

CROSS SPECTRAL ANALYSIS OF PRECIPITATION AND STREAMFLOW DATA SYSTEMS,
W71-10037 07C

GENERATED MONTHLY STREAMFLOWS FOR THE MIDWESTERN AND SOUTHWESTERN UNITED STATES,
W71-10321 02E

TOXIC METALS
MERCURY POLLUTION INTEREST IN IT NOW ON THE UPSWING,
W71-10088 05C

TOXICITY
THE HEALTH EFFECTS OF NITRATES IN WATER (PANEL DISCUSSION),
W71-09957 05B

MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
W71-09989 05C

METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

TOXINS
REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
W71-09987 05C

TRACE ELEMENTS
THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
W71-09982 05A

DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
W71-10072 07B

ATOMIC ABSORPTION DETERMINATION OF MICROGRAM QUANTITIES OF MOLYBDENUM IN LAKE WATERS,
W71-10077 07B

TRACE ELEMENTS IN WATER - A BIBLIOGRAPHY.
W71-10190 05B

COPPER/BICARBONATE EQUILIBRIA IN SOLUTIONS OF BICARBONATE ION AT CONCENTRATIONS SIMILAR TO THOSE FOUND IN NATURAL WATER,
W71-10323 05A

ADSORPTION AND THE RELIABILITY OF TRACE ELEMENTS AS ENVIRONMENT INDICATORS FOR SHALES,
W71-10333 02G

TRACE ELEMENTS(STRONTIUM)
STRONTIUM IN WATER - A BIBLIOGRAPHY.
W71-10192 05B

TRACERS
METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
W71-10045 02L

TRANSBAYKAL
PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
W71-10180 04A

A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAYKAL BASED ON PRECIPITATION (RUSSIAN PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
W71-10181 04A

FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
W71-10183 04A

TWO STAGES IN THE FORMATION OF ICE-LENSES ON FROZEN RIVERS (O DVUKH STADIYAKH FORMIROVANIYA LINZ NA PROMERZAYUSHCHIKH REKAKH),
W71-10350 02C

TRANSIENTS
TRANSIENTS IN PIPELINES CARRYING LIQUIDS OR GASES,
W71-10395 08B

TRANSITION FLOW
JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
W71-10178 08B

TRANSMISSIVITY
PARAMETER ESTIMATION FOR AQUIFER EVALUATION,
W71-10024 02F

PARAMETER ESTIMATION IN HYDROLOGY THE STATE OF THE ART,
W71-10025 02F

TREATMENT FACILITIES
STATE WATER QUALITY CONTROL FUND.
W71-10124 06E

STANDARDS OF PERFORMANCE FOR MARINE SANITATION DEVICES.
W71-10136 06E

MARINE TOILET REGULATIONS,
W71-10138 05G

WATER POLLUTION CONTROL FACILITIES - FINANCING.
W71-10224 06E

WASTE TREATMENT FACILITIES.
W71-10239 06E

WATER POLLUTION CONTROL (CONSTRUCTION GRANTS FOR POLLUTION CONTROL FACILITIES).
W71-10251 06E

ADMINISTRATION OF POLLUTED WATERS,
W71-10253 06E

CHICAGO SANITARY DISTRICT--POLLUTION CONTROL.
W71-10281 06E

CERTIFICATION OF POLLUTION CONTROL FACILITIES FOR TAX RELIEF.
W71-10283 06E

LICENSING OF PRODUCTION AND UTILIZATION FACILITIES (NUCLEAR POWER REACTORS).
W71-10286 06E

PLANT OPERATION (WASTE TREATMENT DISPOSAL REQUIREMENTS).
W71-10300 06E

STATE FINANCIAL ASSISTANCE TO PUBLIC AGENCIES FOR POLLUTION CONTROL FACILITIES.
W71-10301 06E

A1A MOBILE HOME PARK, INC V BREVARD COUNTY (INJUNCTION TO PREVENT CONSTRUCTION AND OPERATION OF SEWAGE TREATMENT PLANT).
W71-10302 06E

POWERS OF GOVERNING BODIES.
W71-10309 06E

TRIAXIAL STRESS
THE MEASUREMENT OF ROCK STRESS CHANGES USING HYDRAULIC BOREHOLE GAGES,
W71-10408 08E

TRIAXIAL TESTS
CAPACITANCE TECHNIQUES FOR RADIAL DEFORMATIONS,
W71-10407 08D

TRIBUTARIES
SIMULATION MODEL OF STREAM CAPTURE,
W71-10337 02E

TRICALCIUM PHOSPHATES
SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
W71-10070 05C

TRICKLE IRRIGATION
SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
W71-10387 03F

TROPHIC LEVEL
ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (WITH GERMAN SUMMARY),
W71-10064 05C

TROPHIC LEVELS
PHYTOPLANKTON COEFFICIENTS AS A METHOD OF DEFINING THE DEGREE TO WHICH WATER HABITATS ARE TROPHIC (IN POLISH),
W71-10075 05C

TROPICAL REGIONS
THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
W71-10031 02G

THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
W71-10032 08D

TULSA (OKLA)
LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

TURBIDITY
REGULATIONS FOR TURBID WATER DISCHARGES AND TO PREVENT INTERMITTENT OR ACCIDENTAL POLLUTION OF WATERS OF THE STATE,
W71-10159 05G

TURBIDITY CURRENTS
BIOCLASTIC TURBIDITE SEDIMENTATION IN COLUMBUS BASIN, BAHAMAS,
W71-10336 02J

TURBULENCE
DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
W71-10177 08B

TURBULENT BOUNDARY LAYERS
STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
W71-10317 08B

TURBULENT FLOW
FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
W71-10173 08B

DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
W71-10177 08B

STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
W71-10317 08B

TURNOUT GATES
BASIC EQUIPMENT IN AUTOMATIC DELIVERY SYSTEMS,
W71-10389 03F

ULTIMATE DISPOSAL
SOLID WASTE DISPOSAL ACT.
W71-10228 06E

ULTRATHIN MEMBRANES
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

UNDERGROUND POWERPLANTS
BETTER SPECIFICATIONS FOR UNDERGROUND WORK,
W71-10401 06B

PROBLEMS WITH LARGE UNDERGROUND STATIONS IN ITALY,
W71-10402 08C

UNDERGROUND WATER STORAGE
ESTIMATING STORAGE CAPACITY IN DEEP ALLUVIUM BY GRAVITY-SEISMIC METHODS,
W71-10384 02F

UNDERSCOUR
PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
W71-10175 08A

UNITED NATIONS
AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

UNITED STATES
ANNUAL, SEASONAL, AND MONTHLY CHANGES IN RUNOFF IN THE UNITED STATES,
W71-10029 02E

STANDARDS OF PERFORMANCE FOR MARINE SANITATION DEVICES.
W71-10136 06E

ENVIRONMENT REPORT--BILLS TO AUTHORIZE CLASS ACTIONS RECOGNIZE RIGHT TO CLEAN ENVIRONMENT,
W71-10274 06E

CERTIFICATION OF POLLUTION CONTROL FACILITIES FOR TAX RELIEF.
W71-10283 06E

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT.
W71-10284 06E

UNSATURATED FLOW
AUGER HOLE SEEPAGE THEORY,
W71-10011 02G

UNSTEADY FLOW
OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
W71-10018 02E

VERTICAL RECHARGE OF UNCONFINED AQUIFER,
W71-10176 02G

DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
W71-10177 08B

URBAN POLLUTION SOURCES
URBAN SOURCES OF NITRATES,
W71-09959 05B

URBAN SOCIOLOGY
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

URBANIZATION
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

URBAN SOURCES OF NITRATES,
W71-09959 05B

URIC ACID DECOMPOSITION
THE DECOMPOSITION OF URIC ACID IN BUILT UP POULTRY LITTER,
W71-10107 05B

USSR
HYDROGEOLOGY OF THE USSR VOLUME 34, THE KARAGANDA OBLAST (RUSSIAN GIDROGEOLOGIYA SSSR TOM XXXIV, KARAGANDINSKAYA OBLAST),
W71-09963 02F

CALCULATION OF THE MEAN ANNUAL DISCHARGE OF SUSPENDED SEDIMENTS AND ITS CYCLIC FLUCTUATIONS (RUSSIAN OPREDELENIYE NORMY I TSIKLICHESKIKH KOLEBANIY GODOVOGO STOKA VZVESHENNYKH NANOSOV),
W71-09964 02J

SEDIMENT DISCHARGE OF RIVERS IN THE MARITIME TERRITORY (RUSSIAN STOK NANOSOV REK PRIMORSKOGO KRAYA),
W71-09965 02J

PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (RUSSIAN FOTOGRAFICHESKIY METOD GRANULOMETRICHESKOGO ANALIZA KRUPNYKH NANOSOV),
W71-09966 02J

RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (RUSSIAN NEKOTORYYE REZUL'TATY LABORATORNYKH ISSLEDOVANIY SKOROSTEY DVIZHENIYA DONNYKJ NANOSOV),
W71-09967 02J

RESULTS OF FIELD INVESTIGATIONS AND CALCULATION OF BED-LOAD DISCHARGE OF THE MZYMTA RIVER (RUSSIAN REZUL'TATY POLEVYKH ISSLEDOVANIY I RASCHET STOKA VLEKOMYKH NANOSOV R. MZYMTY),
W71-09968 02J

THE MOVEMENT OF BOTTOM SEDIMENTS (RUSSIAN DVIZHENIYE DONNYKH NANOSOV),
W71-09969 02J

DYNAMICS OF THE ILI RIVER DELTA (RUSSIAN DINAMIKA DEL'TY REKI ILI),
W71-09970 02J

TENTATIVE LABORATORY INVESTIGATION OF DIVAGATING-RIVER BANK DESTRUCTION (RUSSIAN OPYT ISSLEDOVANIYA V LABORATORNYKH USLOVIYAKH RAZRUSHENIYA BEREGOV (DEYGISHA) NA BLUZHDAYUSHCHIKH REKAKH),

W71-09971 02J

HYDRAULIC CALCULATION OF WATER DISCHARGE AND LEVELS IN RIVER DELTAS,
W71-10038 02E

RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
W71-10061 08B

PROBLEMS IN CALCULATING AND FORECASTING STREAMFLOW (RUSSIAN VOPROSY PROGNOZOV I RASCHETOV STOKA REK).
W71-10180 04A

A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAYKAL BASED ON PRECIPITATION (RUSSIAN PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
W71-10181 04A

FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
W71-10183 04A

CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORREKTSII),
W71-10184 04A

A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
W71-10185 02E

CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN K RASCHETU VODNOGO BALANSA OZ. KHANKA),
W71-10186 02H

TOTAL EVAPORATION IN THE AMUR OBLAST AND MARITIME TERRITORY DURING SUMMER MONTHS (RUSSIAN SUMMARNOYE ISPARENIYE ZA LETNIYE MESYATSY V AMURSKO-PRIMORSKOY OBLASTI),
W71-10187 02D

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I VLAGI),
W71-10188 02D

STORM FLOOD FORMATION PROCESSES (RUSSIAN PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
W71-10189 02E

WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (OSSYPI SLOYA VOLNOVOY PERERABOTKI I IKH GENETICHESKIYE OSOBENNOSTI).
W71-10340 02J

GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K GEOKHIMII ALYUMINIYA V ZONE ENERGICHNOGO GIDROLITICHESKOGO RAZLOZHENIYA ALYUMOSILIKATOV V KORAKH VYVETRIVANIYA).
W71-10341 02K

IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (IDENTIFIKATSIYA NELINEYNYKH GIDROLOGICHESKIKH SISTEM),
W71-10342 02E

MORPHOLOGICAL CHARACTERISTICS OF BRAIDED RIVER CHANNELS IN AN AREA OF TRIBUTARY INFLOW (K VOPROSU O MORFOLOGICHESKIKH OSOBENNOSTYAKH MNOGORUKAVNYKH RECHNYKH RUSEL NA UCHASTKE VPADENIYA PRITOKA),
W71-10343 02J

A STORM FLOOD HYDROGRAPH FORECAST FOR RIVERS ON THE MARITIME TERRITORY FROM RUNOFF OF REPRESENTATIVE BASINS (METODIKA PROGNOZA GIDROGRAFA DOZHDEVYKH PAVODKOV REK PRIMOR'YA NA OSNOVE UCHETA STOKA POKAZATEL'NYKH BASSEYNOV),
W71-10344 04A

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10345 04A

CALCULATING PRECIPITATION IN WATER BALANCE ESTIMATES (UCHET OSADKOV PRI VODNOBALANSOVYKH RASCHETAKH).
W71-10346 02B

A SHORT-TERM FORECAST OF INFLOW TO THE RESERVOIR OF THE ZEYSKAYA HYDROELECTRIC POWER PLANT (KRATKOSROCHNYY PROGNOZ PRITOCHNOSTI V VODOKHRANILISHCHE ZEYSKOY GES),
W71-10347 04A

PRECIPITATION ADJUSTMENTS FOR RAIN-GAGE BUCKET WETTING (K VOPROSU O POPRAVKAKH K OSADKAM NA SMACHIVANIYE VEDRA),
W71-10348 02B

HEAT FLOW TO MELTING ICE ON THE USSURI RIVER (TEPLOPRIKHOD K TAYUSHCHEMU L'DU REKI USSURI),
W71-10349 02C

TWO STAGES IN THE FORMATION OF ICE-LENSES ON FROZEN RIVERS (O DVUKH STADIYAKH FORMIROVANIYA NALEDEY NA PROMERZAYUSHCHIKH REKAKH),
W71-10350 02C

ABSENCE OF DOWNSTREAM TRANSPORT OF ALLUVIUM BY DOWNCUTTING RIVERS, AS ILLUSTRATED BY THE GAR' RIVER (OTSUTSTVIYE PRODOL'NOGO PERENOSA ALLYUVIYA VREZAYUSHCHEYSYA REKI NA PRIMERE R. GAR'),
W71-10352 02J

EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (VLIYANIYE EROZIONNOGO VREZA RECHNYKH DOLIN NA RAZVITIYE KARSTA),
W71-10353 02J

VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (IZMENCHIVOST' VNUTRIGODOVOGO RASPREDELENIYA STOKA REK VOSTOCHNOGO ZAKAVKAZ'YA),
W71-10354 02E

UTAH
POWERS AND DUTIES OF BOARD OF HEALTH--SANITARY STANDARDS FOR PROTECTION OF WATER RESOURCES.
W71-10249 06E

GENERAL RULES AND REGULATIONS RELATING TO WELLS.
W71-10260 06E

POLLUTION OF WATERS.
W71-10292 06E

POWERS OF TOWNS--WATER AND LIGHT.
W71-10444 06E

VALLEYS
CHANNEL PIRACY ON MONTEREY DEEP-SEA FAN,
W71-09947 02J

EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (VLIYANIYE EROZIONNOGO VREZA RECHNYKH DOLIN NA RAZVITIYE KARSTA),
W71-10353 02J

VARIABILITY
TIME VARIATION OF THE DEPTH OF A HIGH SALINITY LAYER IN THE CELTIC SEA,
W71-09949 02K

VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (IZMENCHIVOST' VNUTRIGODOVOGO RASPREDELENIYA STOKA REK VOSTOCHNOGO ZAKAVKAZ'YA),
W71-10354 02E

VARIATIONAL METHODS
VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
W71-10318 02F

VERMONT
BEAN V SEARS, ROEBUCK AND CO (POLLUTION OF WELL HELD PERMANENT DAMAGE TO REAL PROPERTY),
W71-10155 06E

VERTICAL RECHARGE
VERTICAL RECHARGE OF UNCONFINED AQUIFER,
W71-10176 02G

VERTICAL TUBE EVAPORATORS
VTE PILOT PLANT ANNUAL REPORT FOR THE PERIOD ENDING JULY 1, 1968,
W71-09976 03A

VIRGINIA
FLOOD FLOW DOWNSTREAM FROM SLIDE,
W71-10316 02J

VOID RATIO
A THEORY FOR THE SHEAR STRENGTH OF ROCKFILL,
W71-10403 08D

VOIDS
THEORETICAL ANALYSIS OF THE EFFECTS OF AIR VOIDS IN CONCRETE,
W71-10381 08F

WALNUT GULCH EXPERIMENTAL WATERSHED (ARIZ)
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10014 02A

WASHINGTON
WATER POLLUTION--PROTECTION FROM.
W71-10071 06E

CONSERVATION COMMITTEE TO PREVENT POLLUTION OF WATERS BY OIL INDUSTRY.
W71-10073 06E

PUBLIC HEALTH--POLLUTION OF WATER SUPPLY PROSCRIBED.
W71-10074 06E

NUISANCE (WATER POLLUTION).
W71-10078 06E

WATER POLLUTION CONTROL LAWS.
W71-10117 05G

POLLUTION CONTROL FACILITIES--TAX EXEMPTIONS AND CREDITS.
W71-10137 06E

WATER POLLUTION CONTROL.
W71-10223 06E

WATER POLLUTION CONTROL FACILITIES - FINANCING.

W71-10228 06E

WATER POLLUTION--OIL DISCHARGES.
W71-10235 06E

SANITARY CONTROL OF SHELLFISH.
W71-10360 06E

WASTE ASSIMILATION CAPACITY
AN INTRODUCTION TO DETERMINATION OF ESTUARINE ASSIMILATIVE CAPACITY,
W71-10093 05B

WASTE CHARACTERISTICS
REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
W71-10369 05G

WASTE DISPOSAL
THE MOUNTING PROBLEM OF CATTLE FEEDLOT POLLUTION,
W71-10111 05G

SOLID WASTE DISPOSAL STANDARDS.
W71-10114 05G

REGIONAL WATER QUALITY CONTROL.
W71-10125 06E

ADMINISTRATIVE PROCEDURE (PERMITS FOR DISCHARGES OR DEPOSITS INTO NAVIGABLE WATERS).
W71-10135 06E

POLLUTION FROM BOATS AND VESSELS,
W71-10161 05G

DISPOSAL OF CERTAIN SUBSTANCES OPERATION OF CERTAIN EQUIPMENT.
W71-10219 06E

POLLUTION OF NAVIGABLE WATERS AND POLLUTION BY VESSELS.
W71-10220 06E

SEWAGE AND OTHER WASTE PROCEDURE FOR ABATEMENT.
W71-10222 06E

WATER POLLUTION.
W71-10227 06E

SOLID WASTE DISPOSAL ACT.
W71-10228 06E

INJECTION WELL ACT.
W71-10229 06E

TEXAS WATER QUALITY ACT.
W71-10230 06E

GULF COAST WASTE DISPOSAL AUTHORITY (STATE POLLUTION CONTROL BY REGIONAL AGENCY).
W71-10231 06E

PROHIBITION AGAINST DUMPING WASTE MATERIAL IN WATERWAYS.
W71-10234 06E

PERMITS TO DISCHARGE SEWAGE, INDUSTRIAL WASTES OR OTHER WASTES.
W71-10273 06E

FOULING OF WATERS A MISDEMEANOR.
W71-10293 06E

REGULATIONS ON POLLUTION ABATEMENT.
W71-10304 06E

DISPOSAL OF HATCHERY WASTES,
W71-10364 05D

DISPOSAL OF BRINES AND MINERALIZED WATERS.
W71-10441 06E

WASTE DUMPS
THE MOUNTING PROBLEM OF CATTLE FEEDLOT POLLUTION,
W71-10111 05G

OCEAN POLLUTION MESSAGE,
W71-10132 06E

WASTE REUSE
TURNING WASTES INTO PROFITS,
W71-10363 05D

WASTE TREATMENT
CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
W71-09960 05B

PERMITS TO DISCHARGE SEWAGE, INDUSTRIAL WASTES OR OTHER WASTES.
W71-10273 06E

THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
W71-10355 05D

VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

TURNING WASTES INTO PROFITS,
W71-10363 05D

DISPOSAL OF HATCHERY WASTES,
W71-10364 05D

RECYCLED POULTRY NUTRIENTS,
W71-10365 05D

WASTE TREATMENT FACILITIES
DRAINAGE DISTRICTS--POLLUTION CONTROL.
W71-10151 06E

WASTE WATER DISPOSAL
CAGE AND KENNEL WASTE WATER,
W71-10100 05A

WATER POLLUTION CONTROL.
W71-10298 06E

WELL TECHNOLOGY SERVES THE MINING INDUSTRY.
W71-10423 04B

WASTE WATER PRODUCTION
CAGE AND KENNEL WASTE WATER,
W71-10100 05A

WASTE WATER TREATMENT
WATER RECLAMATION.
W71-10127 06E

SPECIAL WATER QUALITY PROVISIONS.
W71-10129 06E

FEDERAL ASSISTANCE FOR TREATMENT FACILITIES.
W71-10216 06E

TREATMENT REQUIREMENTS.
W71-10276 06E

WASTE WATER (POLLUTION)
LOCAL AND REGIONAL WATER POLLUTION CONTROL IN TEXAS,
W71-10262 05G

WASTE WATER(POLLUTION)
WATER QUALITY STANDARDS FOR WATERS OF INDIANA.
W71-10119 05G

DISCHARGES FROM HOUSEBOATS ON OR IN THE WATERS OF THE STATE.
W71-10128 06E

TRANSPORTATION AND DISPOSAL OF WASTE.
W71-10131 06E

POLLUTION OF WATERS MAINTENANCE OF THINGS OFFENSIVE OR UNHEALTHFUL PUNISHMENT.
W71-10448 06E

WASTES
POLLUTION OF WATER SUPPLIES AND PUBLIC PLACES.
W71-10221 06E

WATER ALLOCATION(POLICY)
WATER RIGHTS.
W71-10237 06E

WATER ANALYSIS
IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
W71-09995 05A

LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
W71-09997 05A

ZINC IN WATER - A BIBLIOGRAPHY.
W71-10196 05B

WATER BALANCE
COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
W71-10021 02A

ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
W71-10026 03B

A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
W71-10185 02E

CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN K RASCHETU VODNOGO BALANSA OZ. KHANKA),
W71-10186 02H

TOTAL EVAPORATION IN THE AMUR OBLAST AND MARITIME TERRITORY DURING SUMMER MONTHS (RUSSIAN SUMMARNOYE ISPARENIYE ZA LETNIYE MESYATSY V AMURSKO-PRIMORSKOY OBLASTI),
W71-10187 02D

RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I VLAGI),
W71-10188 02D

STORM FLOOD FORMATION PROCESSES (RUSSIAN PROISESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
W71-10189 02F

CALCULATING PRECIPITATION IN WATER BALANCE ESTIMATES (UCHET OSADKOV PRI VODNOBALANSOVYKH RASCHETAKH).
W71-10346 02B

WATER CHEMISTRY
SILICATE-SEA WATER EQUILIBRIA IN THE OCEAN SYSTEM,
W71-09948 02K

THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
W71-10046 02K

TRACE ELEMENTS IN WATER - A BIBLIOGRAPHY.
W71-10190 05B

MERCURY IN WATER - A BIBLIOGRAPHY.
W71-10191 05B

STRONTIUM IN WATER - A BIBLIOGRAPHY.
W71-10192 05B

MANGANESE IN WATER - A BIBLIOGRAPHY.
W71-10194 05B

MAGNESIUM IN WATER - A BIBLIOGRAPHY.
W71-10195 05B

ZINC IN WATER - A BIBLIOGRAPHY.
W71-10196 05B

'POLYWATER' AND SWEAT SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

COPPER/BICARBONATE EQUILIBRIA IN SOLUTIONS OF BICARBONATE ION AT CONCENTRATIONS SIMILAR TO THOSE FOUND IN NATURAL WATER,
W71-10323 05A

ADSORPTION AND THE RELIABILITY OF TRACE ELEMENTS AS ENVIRONMENT INDICATORS FOR SHALES,
W71-10333 02G

BIMODAL DISTRIBUTION OF PH VALUES OF THERMAL SPRINGS OF THE WORLD.
W71-10339 02K

WATER CIRCULATION
WIND-INDUCED CIRCULATION IN SHALLOW WATER,
W71-10170 02E

WATER CONSERVATION
OKLAHOMA WATER LAW, STREAM AND SURFACE, THE WATER CONSERVATION STORAGE COMMISSION AND THE 1965 AND 1967 AMENDMENTS,
W71-10215 06E

RIVER CONSERVANCY DISTRICTS--POLLUTION CONTROL.
W71-10282 06E

A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
W71-10415 04A

WATER CONTROL
BASIC EQUIPMENT IN AUTOMATIC DELIVERY SYSTEMS,
W71-10380 03F

WATER CONVEYANCE
A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
W71-10183 04A

POWERS OF TOWNS--WATER AND LIGHT.
W71-10444 06F

WATER COSTS
RESEARCH AS GUIDE FOR ESTIMATING WELL COSTS.
W71-10424 08A

WATER DISTRIBUTION(APPLIED)
CAVITATION PARAMETERS FOR OUTLET VALVES,
W71-10370 08B

WATER HAMMER
TRANSIENTS IN PIPELINES CARRYING LIQUIDS OR GASES,
W71-10395 08B

WATER LEVEL FLUCTUATIONS
DESIGN LEVELS IN THE TRANSITION ZONE BETWEEN THE TIDAL REACH AND THE RIVER REGIME REACH,
W71-10039 08B

ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
W71-10040 02E

WATER LEVELS
OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
W71-10413 04B

AQUIFER MODEL RESEARCH REVIEWED.
W71-10416 02F

AVERAGE WATER TABLE DECLINE.
W71-10417 04B

WATER LOSS
A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
W71-10415 04A

WATER MANAGEMENT (APPLIED)
INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
W71-09945 04A

MANAGEMENT STUDY OF A TRANSITIONAL DELTA SYSTEM,
W71-10057 04A

MISSOURI WATER PLAN, STATE LAWS, POLICIES AND PROGRAMS PERTAINING TO WATER AND RELATED LAND RESOURCES.
W71-10270 06E

AQUIFER MODEL RESEARCH REVIEWED.
W71-10416 02F

WATER POLICY
REGIONAL WATER QUALITY CONTROL.
W71-10125 06E

OPEN PUBLIC HEARING TO DETERMINE WATER QUALITY STANDARDS,
W71-10156 06E

CERTIFICATION OF POLLUTION CONTROL FACILITIES FOR TAX RELIEF.
W71-10283 06E

WATER POLLUTION IN GENERAL.
W71-10443 06E

WATER POLLUTION
WELL REGULATIONS AND POLLUTION ABATEMENT.
W71-09933 06E

PLACER MINING WATER POLLUTION,
W71-09934 06E

OCEAN WATER-CONTACT SPORTS.
W71-09935 06E

DOMESTIC WATER AND ICE.
W71-09979 06E

POLLUTION OF IRRIGATION WORKS, WATER SUPPLIES, AND WATER COURSES.
W71-09983 06E

CREATION OF THE STATE BOARD OF HEALTH.
W71-09988 06E

CONSERVATION COMMITTEE TO PREVENT POLLUTION OF WATERS BY OIL INDUSTRY.
W71-10073 06E

NUISANCE (WATER POLLUTION).
W71-10078 06E

POLLUTION OF AQUATIC HABITATS.
W71-10081 06E

ENFORCEMENT AND IMPLEMENTATION OF WATER QUALITY STANDARDS.
W71-10126 06E

POLLUTION CONTROL FACILITIES--TAX EXEMPTIONS AND CREDITS.
W71-10137 06E

WATER POLLUTION.
W71-10145 06E

TAX RELIEF ON POLLUTION CONTROL FACILITIES.
W71-10148 06E

OHIO V WYANDOTTE CHEMICALS CORP (SUPREME COURT DECLINES ORIGINAL JURISDICTION OVER WATER POLLUTION COMPLAINT BY STATE),
W71-10153 06E

BEAN V SEARS, ROEBUCK AND CO (POLLUTION OF WELL HELD PERMANENT DAMAGE TO REAL PROPERTY),
W71-10155 06E

PROCESS CONTROL MODEL FOR OXYGEN REGENERATION OF POLLUTED RIVERS, PHASE II,
W71-10162 05G

LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
W71-10165 05G

HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

TRACE ELEMENTS IN WATER - A BIBLIOGRAPHY.
W71-10190 05B

MERCURY IN WATER - A BIBLIOGRAPHY.
W71-10191 05B

STRONTIUM IN WATER - A BIBLIOGRAPHY.
W71-10192 05B

COPPER IN WATER - A BIBLIOGRAPHY.
W71-10193 05B

CITY OF SPRINGFIELD V NORTH FORK OUTLET DRAINAGE DIST (PREVENTING DRAINAGE DISTRICT FROM STRAIGHTENING RIVER).
W71-10203 06E

COOK V CITY OF DE QUOIN (CITY'S LIABILITY FOR POLLUTION OF STREAM).
W71-10204 06E

WATER POLLUTION.

W71-10227 06E

WATER POLLUTION--OIL DISCHARGES.
W71-10235 06E

DELETERIOUS SUBSTANCES IN STREAMS (CRIMINAL PENALTIES AND ABATEMENT).
W71-10241 06E

OKLAHOMA FEED YARDS ACT.
W71-10243 06E

STATE MARINE BOARD.
W71-10246 06E

DISCHARGING REFUSE INTO DRAINAGE FACILITIES PROHIBITED.
W71-10247 06E

STATUS OF WATER QUALITY AND SIGNIFICANT SOURCES OF WASTE WATER DISCHARGES IN MARYLAND.
W71-10254 05G

THE SANTA BARBARA OIL SPILL,
W71-10266 05G

REGULATIONS ON POLLUTION ABATEMENT.
W71-10304 06E

REGULATION OF COMMERCIAL SHIPPING IN HARBORS TO CONTROL WATER POLLUTION.
W71-10305 06E

AUTO CLUB OF ST PAUL V CITY OF WHITE BEAR LAKE (RIGHT OF CITY TO CONSTRUCT SEWAGE OUTLET INTO LAKE).
W71-10311 06E

SALE OF SHELLFISH FROM POLLUTED AREAS.
W71-10436 06E

PROTECTION OF FISH THROUGH POLLUTION CONTROL.
W71-10445 06E

POLLUTION OF UNDERGROUND WATER.
W71-10446 06E

WATER POLLUTION CONTROL
GRANTS FOR WATER POLLUTION CONTROL.
W71-09939 06E

WATER POLLUTION CONTROL ACT.
W71-10068 06E

WATER POLLUTION--PROTECTION FROM.
W71-10071 06E

CONSERVATION COMMITTEE TO PREVENT POLLUTION OF WATERS BY OIL INDUSTRY.
W71-10073 06E

PUBLIC HEALTH--POLLUTION OF WATER SUPPLY PROSCRIBED.
W71-10074 06E

POLLUTION OF THE HIGH SEAS RESULTING FROM DRILLING AND PRODUCING OPERATIONS--FEDERAL JURISDICTION AND OPERATOR LIABILITY,
W71-10112 05G

MISSOURI RIVER BASIN WATER QUALITY STANDARDS.
W71-10113 05G

RULES FOR THE PREVENTION AND CONTROL OF OIL POLLUTION IN THE WATERS OF THE COMMONWEALTH.
W71-10115 05G

WATER POLLUTION CONTROL LAWS.
W71-10117 05G

DEFINITIONS UNDER STATE WATER QUALITY ACT.
W71-10122 06E

DISCHARGES FROM HOUSEBOATS ON OR IN THE WATERS OF THE STATE.
W71-10128 06E

TRANSPORTATION AND DISPOSAL OF WASTE.
W71-10131 06E

FINANCIAL RESPONSIBILITY FOR OIL POLLUTION CLEANUP.
W71-10133 06E

DISCHARGES OF OIL FOR RESEARCH, DEVELOPMENT AND DEMONSTRATION PURPOSES.
W71-10134 06E

ADMINISTRATIVE PROCEDURE (PERMITS FOR DISCHARGES OR DEPOSITS INTO NAVIGABLE WATERS).
W71-10135 06E

POLLUTION CONTROL FACILITIES--TAX EXEMPTIONS AND CREDITS.
W71-10137 06E

WATER QUALITY CONTROL ACT.
W71-10138 06E

POWERS AND DUTIES OF STATE CONSERVATION COMMISSION AND WATER RESOURCES BOARD.
W71-10141 06E

DISPOSAL OF OIL WASTES.
W71-10142 06E

W71-10143 06E

ENVIRONMENTAL QUALITY COMMISSION.
W71-10144 06E

WATER POLLUTION.
W71-10145 06E

PROTECTION OF WATER SUPPLY GENERALLY.
W71-10146 06E

PROTECTION OF MUNICIPAL WATER SUPPLY.
W71-10147 06E

TAX RELIEF ON POLLUTION CONTROL FACILITIES.
W71-10148 06E

BASS ANGLERS SPORTSMAN'S SOC'Y V US PLYWOOD-CHAMPION PAPERS, INC (PRIVATE PARTY HAS NO RIGHT TO ENFORCE ANTI-POLLUTION PROVISION OF RIVERS AND HARBORS ACT).
W71-10150 06E

PEYTON V HAMMER (NO PRESCRIPTIVE RIGHT TO POLLUTE STREAM),
W71-10154 06E

REGULATIONS FOR PREVENTION OF POLLUTION OF SUBSURFACE WATERS OF THE STATE,
W71-10157 05G

CONCEPT DEVELOPMENT OF A HEAVY DUTY OIL CONTAINMENT SYSTEM FOR USE ON THE HIGH SEAS. VOLUME II. APPENDIX,
W71-10164 05G

LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
W71-10165 05G

HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

ATLANTA COASTAL REGION, MULTI AGENCY OIL AND HAZARDOUS MATERIALS, POLLUTION CONTINGENCY PLAN, REGION IV.
W71-10200 05G

WATER QUALITY STANDARDS FOR INTERSTATE WATERS IN WYOMING.
W71-10214 05G

WATER WELLS AND CATHODIC PROTECTION WELLS.
W71-10217 06E

WATER POLLUTION CONTROL FACILITIES - FINANCING.
W71-10224 06E

WATER POLLUTION CONTROL ACT.
W71-10225 06E

POWERS AND DUTIES OF GAME AND FISH DEPARTMENT--POLLUTION OF WATERS.
W71-10232 06E

STATE BOARD OF HEALTH.
W71-10233 06E

PROHIBITION AGAINST DUMPING WASTE MATERIAL IN WATERWAYS.
W71-10234 06E

FUNCTIONS OF HEALTH DEPARTMENTS (WATER POLLUTION AND QUALITY CONTROL).
W71-10236 06E

OKLAHOMA WATER POLLUTION CONTROL ACT OF 1955.
W71-10238 06E

POLLUTION CONTROL COORDINATING ACT OF 1968.
W71-10240 06E

DELETERIOUS SUBSTANCES IN STREAMS (CRIMINAL PENALTIES AND ABATEMENT).
W71-10241 06E

ACT AUTHORIZING MUNICIPAL CORPORATIONS TO PURCHASE OR CONDEMN LAND FOR WATERWORKS AND THE PROTECTION THEREOF FROM POLLUTION.
W71-10242 06E

OKLAHOMA FEED YARDS ACT.
W71-10243 06E

CONTROL OF CONTAMINATION AND POLLUTION IN SPECIAL AREAS AND WATERS.
W71-10245 06E

POWERS AND DUTIES OF BOARD OF HEALTH--SANITARY STANDARDS FOR PROTECTION OF WATER RESOURCES.
W71-10249 06E

WATER POLLUTION CONTROL (CONSTRUCTION GRANTS FOR POLLUTION CONTROL FACILITIES).
W71-10251 06E

WATER POLLUTION ABATEMENT,
W71-10252 06E

WATER POLLUTION CONTROL IN COLORADO,
W71-10255 05G

WATER POLLUTION CONTROL IN COLORADO.
W71-10258 05G

RULES AND GUIDELINES FOR WATER POLLUTION CONTROL AT LIVESTOCK CONFINEMENT AREAS AND GUIDELINES FOR CONSTRUCTION OF SEALED EVAPORATION AND RETENTION PONDS.

W71-10259 05G

GENERAL RULES AND REGULATIONS RELATING TO WELLS.
W71-10260 06E

POLLUTION AND ATTENDANT PROBLEMS,
W71-10261 05G

LOCAL AND REGIONAL WATER POLLUTION CONTROL IN TEXAS,
W71-10262 05G

WATER POLLUTION CONTROL (ALLOCATION OF REGULATORY POWER IN TEXAS),
W71-10263 06E

THE TEXAS WATER QUALITY BOARD,
W71-10265 05G

ANNUAL REPORT 1970.
W71-10268 05G

ANNUAL REPORT 1968.
W71-10269 05G

SOME ASPECTS OF THE ALABAMA WATER IMPROVEMENT COMMISSION'S PROGRAM FOR CONTROL OF WATER POLLUTION.
W71-10272 05G

ENVIRONMENT REPORT--BILLS TO AUTHORIZE CLASS ACTIONS RECOGNIZE RIGHT TO CLEAN ENVIRONMENT,
W71-10274 06E

FORTY YEARS OF WATER POLLUTION CONTROL IN WISCONSIN A CASE STUDY,
W71-10275 05G

TREATMENT REQUIREMENTS.
W71-10276 06E

SPECIAL REGULATIONS.
W71-10278 06E

ENVIRONMENTAL CONTROL ACT.
W71-10280 06E

CHICAGO SANITARY DISTRICT--POLLUTION CONTROL.
W71-10281 06E

RIVER CONSERVANCY DISTRICTS--POLLUTION CONTROL.
W71-10282 06E

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT.
W71-10284 06E

WATER POLLUTION (STATUTORY AUTHORITY FOR ADMINISTERING POLLUTION CONTROL PROGRAM).
W71-10291 06E

POLLUTION OF WATERS.
W71-10292 06E

FOULING OF WATERS A MISDEMEANOR.
W71-10293 06E

WATER CONSERVATION COMMISSION.
W71-10294 06E

CONCERNING WATER POLLUTION, AND PROVIDING PENALTIES FOR VIOLATIONS RELATING TO POLLUTION OF STATE WATERS.
W71-10295 06E

POWER OVER WATER POLLUTION CONTROL AND PENALTY FOR POISONING OF WATERS.
W71-10296 06E

WATER POLLUTION CONTROL.
W71-10298 06E

PLANT OPERATION (WASTE TREATMENT DISPOSAL REQUIREMENTS).
W71-10300 06E

REGULATION OF COMMERCIAL SHIPPING IN HARBORS TO CONTROL WATER POLLUTION.
W71-10305 06E

COLORADO WATER POLLUTION CONTROL ACT OF 1966.
W71-10308 06E

POWERS OF GOVERNING BODIES.
W71-10309 06E

POLLUTION AS NUISANCE.
W71-10361 06E

ECONOMICS OF WATER POLLUTION CONTROL FOR CATTLE FEEDLOT OPERATIONS,
W71-10377 05G

REMOVAL OF SUBSTANCES POLLUTING WATERS.
W71-10378 06E

POLLUTION OF UNDERGROUND WATER.
W71-10446 06E

POLLUTION OF WATERS MAINTENANCE OF THINGS OFFENSIVE OR UNHEALTHFUL PUNISHMENT.
W71-10448 06E

POLLUTING WATER.
W71-10449 06E

WATER POLLUTION CONTROL EQUIPMENT
CONCEPT DEVELOPMENT OF A HEAVY DUTY OIL CONTAINMENT SYSTEM FOR USE ON THE HIGH SEAS. VOLUME II. APPENDIX,
W71-10164 05G

LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
W71-10165 05G

HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

WATER POLLUTION EFFECTS
NITRATE AND WATER SUPPLY SOURCE AND CONTROL.
W71-09952 05B

NITRATES IN WATER SUPPLIES - THE PROBLEM,
W71-09953 05B

SECONDARY EFFECTS OF NITROGEN IN WATER,
W71-09958 05B

INTERRELATIONS OF SEVERAL ABIOTIC FACTORS AND THE HIGHER AQUATIC PLANTS IN A STREAM ECOSYSTEM,
W71-10036 05C

MERCURY POLLUTION INTEREST IN IT NOW ON THE UPSWING,
W71-10088 05C

COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

PROTECTION OF FISH THROUGH POLLUTION CONTROL.
W71-10445 06E

WATER POLLUTION SOURCES
NITRATE AND WATER SUPPLY SOURCE AND CONTROL.
W71-09952 05B

NITRATES IN WATER SUPPLIES - THE PROBLEM,
W71-09953 05B

EXISTING LEVELS OF NITRATES IN WATERS - THE ILLINOIS SITUATION,
W71-09956 05A

URBAN SOURCES OF NITRATES,
W71-09959 05B

THE CONTRIBUTION OF URBAN AND AGRICULTURAL PESTICIDE USE TO THE CONTAMINATION OF THE RED CEDAR RIVER,
W71-10035 05B

WATER QUALITY MODELING OF ESTUARIES,
W71-10047 05G

CORPORATIONS TO STORE SALT WATER,
W71-10097 06E

FREEDMAN V BOROUGH OF WEST HAZELTON (PUBLIC NUISANCE CAUSED BY DISCHARGE OF SEWAGE INTO DITCH).
W71-10197 06E

TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

INTRUSION AND POLLUTION OF WATER--RELATIONSHIPS WITH GAS AND OIL.
W71-10250 06E

WATER QUALITY CRITERIA FOR INTRASTATE WATERS.
W71-10267 06E

FOULING OF WATERS A MISDEMEANOR.
W71-10293 06E

MAJOR PROBLEMS OF WATER POLLUTION CREATED BY AGRICULTURAL PRACTICES,
W71-10374 05G

WATER PROPERTIES
'POLYWATER' AND SWEAT SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

WATER PURIFICATION
REGULATIONS FOR PUBLIC WATER SUPPLIES.
W71-10279 06E

WATER QUALITY
QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
W71-09936 05B

THE HEALTH EFFECTS OF NITRATES IN WATER (PANEL DISCUSSION),
W71-09957 05B

AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

WATER QUALITY MODELING OF ESTUARIES,
W71-10047 05G

CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

WATER QUALITY CONTROL ACT.
W71-10121 06E

OPEN PUBLIC HEARING TO DETERMINE WATER QUALITY STANDARDS,
W71-10156 06E

WATER QUALITY STANDARDS FOR INTERSTATE WATERS,
W71-10160 05G

COPPER IN WATER - A BIBLIOGRAPHY.
W71-10193 05B

MANGANESE IN WATER - A BIBLIOGRAPHY.
W71-10194 05B

MAGNESIUM IN WATER - A BIBLIOGRAPHY.
W71-10195 05B

STATUS OF WATER QUALITY AND SIGNIFICANT SOURCES OF WASTE WATER DISCHARGES IN MARYLAND.
W71-10254 05G

WATER QUALITY STANDARDS.
W71-10257 05G

WATER POLLUTION CONTROL IN COLORADO.
W71-10258 05G

WATER QUALITY CRITERIA.
W71-10271 05G

SOME ASPECTS OF THE ALABAMA WATER IMPROVEMENT COMMISSION'S PROGRAM FOR CONTROL OF WATER POLLUTION.
W71-10272 05G

2ND COMPENDIUM OF ANIMAL WASTE MANAGEMENT.
W71-10366 05G

WATER QUALITY ACT
DEFINITIONS UNDER STATE WATER QUALITY ACT.
W71-10122 06E

STATE WATER QUALITY CONTROL.
W71-10123 06E

TEXAS WATER QUALITY ACT.
W71-10230 06E

POLLUTION CONTROL COORDINATING ACT OF 1968.
W71-10240 06E

WATER QUALITY CRITERIA FOR INTRASTATE WATERS.
W71-10267 06E

WATER QUALITY ACT.
W71-10290 06E

STATE WATER POLLUTION CONTROL.
W71-10306 06E

WATER QUALITY CONTROL
EXISTING LEVELS OF NITRATES IN WATER - THE CALIFORNIA SITUATION,
W71-09955 05B

PUBLIC HEALTH--POLLUTION OF WATER SUPPLY PROSCRIBED.
W71-10074 06E

DISCHARGES INTO CERTAIN WATERS.
W71-10085 06E

MISSOURI RIVER BASIN WATER QUALITY STANDARDS.
W71-10113 05G

BASIN REGULATIONS--WATER QUALITY (WATER QUALITY STANDARDS, ABATEMENT, AND ENFORCEMENT PROCEDURES).
W71-10116 05G

WATER POLLUTION CONTROL LAWS.
W71-10117 05G

WATER QUALITY STANDARDS FOR WATERS OF INDIANA.
W71-10119 05G

WATER QUALITY CONTROL ACT.
W71-10121 06E

REGIONAL WATER QUALITY CONTROL.
W71-10125 06E

ENFORCEMENT AND IMPLEMENTATION OF WATER QUALITY STANDARDS.
W71-10126 06E

SPECIAL WATER QUALITY PROVISIONS.
W71-10129 06E

CLEAN WATER BOND LAW OF 1970.
W71-10130 06E

WATER QUALITY CONTROL ACT.
W71-10138 06E

ENVIRONMENTAL QUALITY COMMISSION.
W71-10144 06E

PROTECTION OF WATER SUPPLY GENERALLY.
W71-10146 06E

PROTECTION OF MUNICIPAL WATER SUPPLY.
W71-10147 06E

REGULATIONS FOR TURBID WATER DISCHARGES AND TO PREVENT INTERMITTENT OR ACCIDENTAL POLLUTION OF WATERS OF THE STATE,
W71-10159 05G

PROCESS CONTROL MODEL FOR OXYGEN REGENERATION OF POLLUTED RIVERS, PHASE II,
W71-10162 05G

WATER QUALITY STANDARDS FOR INTERSTATE WATERS IN WYOMING.
W71-10214 05G

FEDERAL ASSISTANCE FOR TREATMENT FACILITIES.
W71-10216 06E

PENALTIES FOR OIL DEPOSITED IN STATE WATERS.
W71-10218 06E

POLLUTION OR NAVIGABLE WATERS AND POLLUTION BY VESSELS.
W71-10220 06E

POLLUTION OF WATER SUPPLIES AND PUBLIC PLACES.
W71-10221 06E

SEWAGE AND OTHER WASTE PROCEDURE FOR ABATEMENT.
W71-10222 06E

WATER POLLUTION CONTROL.
W71-10223 06E

TEXAS WATER QUALITY ACT.
W71-10230 06E

GULF COAST WASTE DISPOSAL AUTHORITY (STATE POLLUTION CONTROL BY REGIONAL AGENCY).
W71-10231 06E

FUNCTIONS OF HEALTH DEPARTMENTS (WATER POLLUTION AND QUALITY CONTROL).
W71-10236 06E

POLLUTION CONTROL COORDINATING ACT OF 1968.
W71-10240 06E

CONTROL OF CONTAMINATION AND POLLUTION IN SPECIAL AREAS AND WATERS,
W71-10245 06E

WATER SUPPLY AND SEWAGE.
W71-10248 06E

ADMINISTRATION OF POLLUTED WATERS,
W71-10253 06E

WATER QUALITY STANDARDS.
W71-10257 05G

LOCAL AND REGIONAL WATER POLLUTION CONTROL IN TEXAS,
W71-10262 05G

WATER QUALITY CRITERIA FOR INTRASTATE WATERS.
W71-10267 06E

ANNUAL REPORT 1970.
W71-10268 05G

ANNUAL REPORT 1968.
W71-10269 05G

WATER QUALITY CRITERIA.
W71-10271 05G

TREATMENT REQUIREMENTS.
W71-10276 06E

WATER POLLUTION (STATUTORY AUTHORITY FOR ADMINISTERING POLLUTION CONTROL PROGRAM).
W71-10291 06E

POLLUTION OF WATERS.
W71-10292 06E

WATER QUALITY STANDARDS.
W71-10299 06E

WATER USE CLASSIFICATIONS AND WATER QUALITY STANDARDS.
W71-10312 06E

POLLUTION AS NUISANCE.
W71-10361 06E

FURNISHING POTABLE WATER.
W71-10435 06E

WATER QUALITY CONTROL STREAMS
REAERATION OF STREAMS AND RESERVOIRS ANALYSIS AND BIBLIOGRAPHY,
W71-10202 05G

WATER RESOURCES DEVELOPMENT
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
W71-09938 06A

PROCEEDINGS OF TWENTY-FOURTH ANNUAL NEVADA WATER CONFERENCE.
W71-09951 06B

WATER QUALITY CONTROL ACT.
W71-10121 06E

POWERS AND DUTIES OF STATE CONSERVATION COMMISSION AND WATER RESOURCES BOARD.
W71-10141 06E

OKLAHOMA WATER LAW, STREAM AND SURFACE, THE WATER CONSERVATION STORAGE COMMISSION AND THE 1965 AND 1967 AMENDMENTS,
W71-10215 06E

POLLUTION OF WATER SUPPLIES AND PUBLIC PLACES.
W71-10221 06E

ENVIRONMENTAL STATEMENTS--PROPOSED GUIDELINES ON PREPARATION AND COORDINATION.
W71-10287 06E

CONSTITUTIONAL POLICY FAVORING CONSERVATION.
W71-10288 06E

KLAMATH RIVER BASIN COMPACT.
W71-10439 06E

WATER RESOURCES INVESTIGATIONS
SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
W71-10028 02A

WATER RESOURCES PLANNING
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

WATER REUSE
WATER RECLAMATION.
W71-10127 06E

WATER SPORTS
OCEAN WATER-CONTACT SPORTS.
W71-09935 06E

WATER STORAGE
A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
W71-10185 02E

WATER STRUCTURE
NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
W71-09974 01B

W71-09974 01B

WATER SUPPLY
NITRATE AND WATER SUPPLY SOURCE AND CONTROL.
W71-09952 05B

NITRATES IN WATER SUPPLIES - THE PROBLEM,
W71-09953 05B

EXISTING LEVELS OF NITRATES IN WATER - THE CALIFORNIA SITUATION,
W71-09955 05B

DOMESTIC WATER AND ICE.
W71-09979 06E

POLLUTION OF IRRIGATION WORKS, WATER SUPPLIES, AND WATER COURSES.
W71-09983 06E

WATER POLLUTION--PROTECTION FROM.
W71-10071 06E

PROTECTION OF WATER SUPPLY GENERALLY.
W71-10146 06E

WATER SUPPLY AND SEWAGE.
W71-10248 06E

REGULATIONS FOR PUBLIC WATER SUPPLIES.
W71-10279 06E

POLLUTION OF WATERS MAINTENANCE OF THINGS OFFENSIVE OR UNHEALTHFUL PUNISHMENT.
W71-10448 06E

WATER SUPPLY SYSTEMS
THE SELETAR SCHEME, SINGAPORE,
W71-10382 03B

WATER TABLE
VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
W71-10318 02F

WATER TEMPERATURE
EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

WATER TREATMENT
TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
W71-09961 05B

WATER UTILIZATION
WATER USE ACT.
W71-10067 06E

REGULATIONS GOVERNING THE USE OF WATER RESOURCES AND PUBLIC SUBAQUEOUS LANDS.
W71-10120 06E

WATER USE CLASSIFICATIONS AND WATER QUALITY STANDARDS.
W71-10312 06E

WATER WELL CONTRACTOR
ESTIMATING WATER WELL SPECIFIC CAPACITY UTILIZING PERMEABILITY OF DISTURBED SAMPLES,
W71-10421 08A

WATER WELL EFFICIENCY
MAINTENANCE OF WELL EFFICIENCY,
W71-10432 08A

WATER WELLS
AUGER HOLE SEEPAGE THEORY,
W71-10011 02G

OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

SHOOTING ROCK WELL INVOLVES RISKS.
W71-10419 04B

BEST WELL DEPTH IN CRYSTALLINE ROCKS,
W71-10420 08A

ESTIMATING WATER WELL SPECIFIC CAPACITY UTILIZING PERMEABILITY OF DISTURBED SAMPLES,
W71-10421 08A

NEW TOOLS FOR NEW AND OLD WELLS,
W71-10422 08A

WELL TECHNOLOGY SERVES THE MINING INDUSTRY.
W71-10423 04B

RESEARCH IS GUIDE FOR ESTIMATING WELL COSTS.
W71-10424 08A

PIPE AND CASING IN WATER-WELL DRILLING.
W71-10425 08A

ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
W71-10428 03B

CHECKING ALIGNMENT AND PLUMBNESS OF WELLS.
W71-10429 08A

DISINFECTING WELLS AND WATER PIPING.
W71-10431 08A

MAINTENANCE OF WELL EFFICIENCY,
W71-10432 08A

METALS THAT RESIST CORROSION SAVE MONEY.
W71-10433 04B

CHARTS SHOW AIR-LIFT PERFORMANCE.
W71-10434 08A

WATER YIELD
HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
W71-10179 03B

WATERCOURSES(LEGAL)
IMPROVEMENT OF WATERCOURSES OR DRAINS WEST OF CASCADES.
W71-10438 06E

WATERSHED MANAGEMENT
PROTECTION OF LAKE TAHOE WATERSHED.
W71-10307 06E

WATERSHEDS(BASINS)
CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORREKTSII),
W71-10184 04A

WATERWAYS
MODERNIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY HYDRAULIC MODEL INVESTIGATION,
W71-10001 08B

WAVES
EFFECTS OF HURRICANE BARRIER ON NAVIGATION CONDITIONS IN EAST PASSAGE, NARRAGANSETT BAY, RHODE ISLAND HYDRAULIC MODEL INVESTIGATION,
W71-10000 08B

SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN HYDRAULIC MODEL INVESTIGATION,
W71-10008 08B

W71-10009 08B

WAVES(WATER)
SURFACE DISTURBANCE FROM SUBMERGED JET,

W71-10171 08B

FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
W71-10174 08B

PUGET PEAK AVALANCHE, ALASKA.
W71-10335 02J

WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (ROSSYPI SLOYA VOLNOVOY PERERABOTKI I IKH GENETICHESKIYE OSOBENNOSTI).
W71-10340 02J

WEATHER FORECASTING
PARAMETER ESTIMATION FOR WET-DAY SEQUENCES,
W71-10023 02B

A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
W71-10319 02B

WEATHER MODIFICATION
ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
W71-10026 03B

HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
W71-10179 03B

WEATHER PATTERNS
A STATISTICAL DATA PLAN FOR BOMEX,
W71-10033 02B

WEATHERING
THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
W71-10031 02G

GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K GEOKHIMII ALYUMINIYA V ZONE ENERGICHNOGO GIDROLITICHESKOGO RAZLOZHENIYA ALYUMOSILIKATOV V KORAKH VYVETRIVANIYA).
W71-10341 02K

WELL ALIGNMENT
CHECKING ALIGNMENT AND PLUMBNESS OF WELLS.
W71-10429 08A

WELL CASINGS
PIPE AND CASING IN WATER-WELL DRILLING.
W71-10425 08A

WELL COSTS
RESEARCH IS GUIDE FOR ESTIMATING WELL COSTS.
W71-10424 08A

WELL REGULATION
REGULATIONS GOVERNING THE USE OF WATER RESOURCES AND PUBLIC SUBAQUEOUS LANDS.
W71-10120 06E

WELL REGULATIONS
WELL REGULATIONS AND POLLUTION ABATEMENT.
W71-09933 06E

DISPOSAL OF OIL WASTES.
W71-10103 06E

WATER WELLS AND CATHODIC PROTECTION WELLS.
W71-10217 06E

GENERAL RULES AND REGULATIONS RELATING TO WELLS.
W71-10260 06E

REGULATION OF OIL AND GAS WELLS.
W71-10440 06E

WELL STIMULATION
SHOOTING ROCK WELL INVOLVES RISKS.
W71-10419 04B

WELLS
BEAN V SPARS, ROEBUCK AND CO (POLLUTION OF WELL HELD PERMANENT DAMAGE TO REAL PROPERTY),
W71-10155 06E

NEW TOOLS FOR NEW AND OLD WELLS,
W71-10422 08A

TEMPERATURE SURVEYS THE ART OF INTERPRETATION,
W71-10427 03B

WETTING
PRECIPITATION ADJUSTMENTS FOR RAIN-GAGE BUCKET WETTING (K VOPROSU O POPRAVKAKH K OSADKAM NA SMACHIVANIYE VEDRA),
W71-10348 02B

WET-DAY SEQUENCE FORECASTING
PARAMETER ESTIMATION FOR WET-DAY SEQUENCES,
W71-10023 02B

WINDS
WIND-INDUCED CIRCULATION IN SHALLOW WATER,
W71-10170 02E

WISCONSIN
SOLID WASTE DISPOSAL STANDARDS.
W71-10114 05G

FORTY YEARS OF WATER POLLUTION CONTROL IN WISCONSIN A CASE STUDY,
W71-10275 05G

WITHDRAWAL
OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

WITHDRAWALS
AVERAGE WATER TABLE DECLINE.
W71-10417 04B

WOOD WASTES
DISCHARGES INTO CERTAIN WATERS.
W71-10085 06E

WYOMING
CREATION OF THE STATE BOARD OF HEALTH.
W71-09988 06E

WATER QUALITY STANDARDS FOR INTERSTATE WATERS IN WYOMING.
W71-10214 05G

POLLUTION OF UNDERGROUND WATER.
W71-10446 06E

ZINC
REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
W71-09987 05C

ZINC IN WATER - A BIBLIOGRAPHY.
W71-10196 05B

TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

ZINC RADIOISOTOPES
ZINC IN WATER - A BIBLIOGRAPHY.
W71-10196 05B

ZOOPLANKTON
ZOOPLANKTON-PHYTOPLANKTON RELATIONSHIPS IN DEVILS LAKE, NORTH DAKOTA,
W71-10063 05C

TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

THE FOOD SOURCES OF LAKE ZOOPLANKTON (IN POLISH),
W71-10094 05C

EFFECTS OF ZOOPLANKTON ON PHOTOSYNTHESIS BY ALGAE IN LAKES,
W71-10098 05C

AUTHOR INDEX

ACKERMAN, NORBERT L.
SURFACE DISTURBANCE FROM SUBMERGED JET,
W71-10171 08B

AITSCHAEFFL, A. G.
CAPACITANCE TECHNIQUES FOR RADIAL DEFORMATIONS,
W71-10407 08D

AMOROCHO, J.
POWER LOSSES AND FLOW TOPOLOGIES IN CONVERGING MANIFOLD,
W71-10397 08B

ANDERSON, A. I.
BLAST-FRACTURING,
W71-10418 08A

ANDERSON, DAVID W.
PRIMARY PRODUCTIVITY MEASUREMENTS AT DEVILS LAKE, NORTH DAKOTA,
W71-10062 05C

ZOOPLANKTON-PHYTOPLANKTON RELATIONSHIPS IN DEVILS LAKE, NORTH DAKOTA,
W71-10063 05C

ANDERSON, EARL D.
TURNING WASTES INTO PROFITS,
W71-10363 05D

ANTHONY, F. H.
PARTICLE SIZE, WATER-STABLE AGGREGATES, AND BACTERIAL POPULATIONS IN LAKE SEDIMENTS,
W71-10069 05C

ANTONOV, V. S.
RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
W71-10061 08B

APOSTOL, RAFAEL T.
SURFACE DISTURBANCE FROM SUBMERGED JET,
W71-10171 08B

APOSTOL, SIMONE
CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

ARAL, MUSTAFA M.
SEEPAGE FORCE ON INTERFACIAL BED PARTICLES,
W71-09943 02J

ARMSTRONG, RICHARD
PRIMARY PRODUCTIVITY MEASUREMENTS AT DEVILS LAKE, NORTH DAKOTA,
W71-10062 05C

ZOOPLANKTON-PHYTOPLANKTON RELATIONSHIPS IN DEVILS LAKE, NORTH DAKOTA,
W71-10063 05C

ARNOW, TED
GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN THE GREAT BASIN, U.S.A.,
W71-10052 02F

ARON, GERT
PARAMETER ESTIMATION IN HYDROLOGY THE STATE OF THE ART,
W71-10025 02F

ASFUR, HANI
AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
W71-09938 06A

ATTOE, O. J.
EFFECT OF MANURE APPLICATION, AERATION, AND SOIL PH ON SOIL NITROGEN TRANSFORMATIONS AND ON CERTAIN SOIL TEST VALUES,
W71-10357 05D

BACKUS, ROBERT A.
WATER POLLUTION CONTROL IN COLORADO,
W71-10255 05G

BALWAL, L. K.
AN ELECTROMETRIC METHOD FOR THE DETERMINATION OF SOIL MOISTURE,
W71-10012 02G

BALDWIN, MALCOLM F.
THE SANTA BARBARA OIL SPILL,
W71-10266 05G

BALL, JAMES W.
MODEL STUDY OF POWER INTAKE GATE OF MOSSYROCK DAM,
W71-10168 08C

BALUTA, D.
INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

BANDYOPADHYAY, K. K.
ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
W71-10040 02E

BARVINSKAYA, L. V.
FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

BEASLEY, THOMAS M.
MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
W71-10206 05C

BENDIXEN, T. W.
SOIL CHEMICAL CHANGES AND INFILTRATION RATE REDUCTION UNDER SEWAGE SPREADING,
W71-10108 05B

BENJAMIN, J. R.
DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

BEREZNIKOV, K. P.
TOTAL EVAPORATION IN THE AMUR OBLAST AND MARITIME TERRITORY DURING SUMMER MONTHS (RUSSIAN SUMMARNOYE ISPARENIYE ZA LETNIYE MESYATSY V AMURSKO-PRIMORSKOY OBLASTI),
W71-10187 02D

BERGMAN, ERNEST L.
THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
W71-10355 05D

BERTRAND, A. R.
THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

BHAYANI, KIRAN H.
METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

BHUIYA, FEZAUL KARIM
STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
W71-10172 02A

BISHOP, JOHN W.
EFFECTS OF ZOOPLANKTON ON PHOTOSYNTHESIS BY ALGAE IN LAKES,
W71-10098 05C

BLATT, HARVEY
DURABILITIES OF SAND SIZE SCHIST AND 'VOLCANIC' ROCK FRAGMENTS DURING FLUVIAL TRANSPORT, ELK CREEK, BLACK HILLS, SOUTH DAKOTA,
W71-10329 02J

BOAST, C. W.
AUGER HOLE SEEPAGE THEORY,
W71-10011 02G

BOBROVITSKAYA, N. N.
CALCULATION OF THE MEAN ANNUAL DISCHARGE OF SUSPENDED SEDIMENTS AND ITS CYCLIC FLUCTUATIONS (RUSSIAN OPREDELENIYE NORMY I TSIKLICHESKIKH KOLEBANIY GODOVOGO STOKA VZVESHENNYKH NANOSOV),
W71-09964 02J

BOGOLYUBOVA, I. V.
RESULTS OF FIELD INVESTIGATIONS AND CALCULATION OF BED-LOAD DISCHARGE OF THE MZYMTA RIVER (RUSSIAN REZUL'TATY POLEVYKH ISSLEDOVANIY I RASCHET STOKA VLEKOMYKH NANOSOV R. MZYMTY),
W71-09968 02J

BONDAR, CONSTANTIN
HYDRAULIC CHARACTERISTICS OF THE HYDROMETRIC SECTION AT THE MOUTH OF THE SULINA ARM (FRENCH CARACTERISTIQUES HYDRAULIQUES DE LA SECTION HYDROMETRIQUE A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10043 02J

BONDAR, C.
DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL (FRENCH DONNEES SUR LES CHARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

CALCULATION OF COARSE ALLUVIUM DISCHARGE (SANDS) FROM THE SULINA ARM (FRENCH CALCUL DE L'ECOULEMENT DES ALLUVIONS GROSSIERES (SABLES) A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10044 02J

BORCHARDT, JACK A.
SECONDARY EFFECTS OF NITROGEN IN WATER,
W71-09958 05B

BORNHOLD, BRIAN D.
BIOCLASTIC TURBIDITE SEDIMENTATION IN COLUMBUS BASIN, BAHAMAS,
W71-10336 02J

BORSHCHEVSKIY, YE. N.
IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (IDENTIFIKATSIYA NELINEYNYKH GIDROLOGICHESKIKH SISTEM),
W71-10342 02E

BOSE, PAROMITA

SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
W71-10070 05C

BOUDREAUX, JACK
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

BRASFIELD, CHARLES W.
MAGIC ISLAND COMPLEX, INCLUDING KEWALO BASIN AND ALA WAI BOAT HARBOR, HONOLULU, OAHU, HAWAII. HYDRAULIC MODEL INVESTIGATION,
W71-10003 08B

BRATZLER, J. W.
VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

BRESSLER, GLENN O.
THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
W71-10355 05D

BRIDIE, A. L. A. M.
TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

BROCK, THOMAS D.
BIMODAL DISTRIBUTION OF PH VALUES OF THERMAL SPRINGS OF THE WORLD.
W71-10339 02K

BROOKS, T. W.
SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

BROWN, PAUL
POLLUTION AND ATTENDANT PROBLEMS,
W71-10261 05G

BURNETT, WILLIAM E.
AIR POLLUTION FROM ANIMAL WASTES,
W71-10101 05A

BURNS, PETER A.
PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,
W71-10207 05C

BUYALSKI, C. P.
BASIC EQUIPMENT IN AUTOMATIC DELIVERY SYSTEMS,
W71-10389 03F

BYKOV, V. D.
VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (IZMENCHIVOST' VNUTRIGODOVOGO RASPREDELENIYA STOKA REK VOSTOCHNOGO ZAKAVKAZ'YA),
W71-10354 02E

BYSTROV, A. V.
A FLOOD HYDROGRAPH FORECAST FOR RIVERS OF EASTERN TRANSBAYKAL BASED ON PRECIPITATION (RUSSIAN PROGNOZ GIDROGRAFA PAVODKOV REK VOSTOCHNOGO ZABAYKAL'YA PO OSADKAM),
W71-10181 04A

CALOTTE, J. E.
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

CAIRNS, JOHN, JR.
REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
W71-09987 05C

CALIN, N.
A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 08B

CALLAS, GERALD
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

CALLENDER, EDWARD
PRIMARY PRODUCTIVITY MEASUREMENTS AT DEVILS LAKE, NORTH DAKOTA,
W71-10062 05C

CAMERON, KENNETH L.
DURABILITIES OF SAND SIZE SCHIST AND 'VOLCANIC' ROCK FRAGMENTS DURING FLUVIAL TRANSPORT, ELK CREEK, BLACK HILLS, SOUTH DAKOTA,
W71-10329 02J

CAMPBELL, ROBERT S.
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

CARDINAL, ANDRE
A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
W71-10066 05C

CARMICHAEL, DONALD M.
FORTY YEARS OF WATER POLLUTION CONTROL IN WISCONSIN A CASE STUDY,
W71-10275 05G

CARR, T., JR.
RECURRING TEXAS DROUGHTS,
W71-10410 07C

CARSSOW, TIM
WATER POLLUTION CONTROL (ALLOCATION OF REGULATORY POWER IN TEXAS),
W71-10263 06E

CASTAGNA, MICHAEL
TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

CHANGNON, STANLEY A., JR.
ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
W71-10026 03B

CHARLES, D. R.
THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
W71-10105 05C

CHATHAM, CLAUDE E., JR.
MAGIC ISLAND COMPLEX, INCLUDING KEWALO BASIN AND ALA WAI BOAT HARBOR, HONOLULU, OAHU, HAWAII. HYDRAULIC MODEL INVESTIGATION,
W71-10003 08B

CHATIKAVANIJ, K.
THE DETERMINATION OF POWER BENEFITS FROM A MULTIPURPOSE WATER PROJECT,
W71-10383 06B

CHAU, YIU-KEE
DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
W71-10072 07B

CHAU, Y. K.
ATOMIC ABSORPTION DETERMINATION OF MICROGRAM QUANTITIES OF MOLYBDENUM IN LAKE WATERS,
W71-10077 07B

CHEN, W. F.
LIMIT ANALYSIS OF STABILITY OF SLOPES,
W71-10393 08D

CHIANG, H. C.
EFFECTS OF MANURE APPLICATIONS AND MITE PREDATION ON CORN ROOTWORM POPULATIONS IN MINNESOTA,
W71-10359 05C

CHIANG, SIE LING
A RUNOFF POTENTIAL RATING TABLE FOR SOILS,
W71-10016 02G

CLARKE, R. T.
THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
W71-10020 02A

COATES, M. J.
COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
W71-10021 02A

CODY, R. D.
ADSORPTION AND THE RELIABILITY OF TRACE ELEMENTS AS ENVIRONMENT INDICATORS FOR SHALES,
W71-10333 02G

COFFMAN, WILLIAM P.
ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (WITH GERMAN SUMMARY),
W71-10064 05C

COLE, CHARLES F.
CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER FLOUNDER, PSEUDO-PLEURONECTES AMERICANUS, FROM THE WEWEANTIC RIVER ESTUARY, MASSACHUSETTS,
W71-10212 05C

COLLINS, J. D.
THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
W71-09982 05A

COREY, J. C.
DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
W71-09950 02J

COX, JAMES L.
DDT RESIDUES IN MARINE PHYTOPLANKTON INCREASE FROM 1955 TO 1969,
W71-09984 05A

CUMMINS, KENNETH W.
ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (WITH GERMAN SUMMARY),
W71-10064 05C

DAFFIN, C. L.
SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

DAGNE, R. R.
ANIMAL WASTES--A MAJOR POLLUTION PROBLEM,

W71-10368 05G

DAI, YIN BEN
SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN HYDRAULIC MODEL INVESTIGATION,
W71-10008 08B

W71-10009 08B

DAI, YIN-BEN
DESIGNS FOR RUBBLE-MOUND BREAKWATERS, DANA POINT HARBOR, CALIFORNIA,
W71-10199 08B

DARBYSHIRE, J.
TIME VARIATION OF THE DEPTH OF A HIGH SALINITY LAYER IN THE CELTIC SEA,
W71-09949 02K

DAS GUPTA, S.
ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
W71-10040 02E

DAVIDSON, BURTON
PROCESS CONTROL MODEL FOR OXYGEN REGENERATION OF POLLUTED RIVERS, PHASE II,
W71-10162 05G

DAVIS, RICHARD M.
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

DAVIS, S.
SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
W71-10387 03F

DAVIS, S. N.
BEST WELL DEPTH IN CRYSTALLINE ROCKS,
W71-10420 08A

DAWOOD, I. K.
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

DAY, D. L.
LABORATORY STUDIES OF AEROBIC STABILIZATION OF SWINE WASTE,
W71-10106 05D

DAZO, B. C.
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

DE WIPST, ROGER J. M.
HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
W71-10050 02L

DEBBY, SYIVIA B.
PRIMARY PRODUCTION DEPRESSION OF OXYGEN EVOLUTION IN ALGAL CULTURES BY ORGANOPHOSPHORUS INSECTICIDES,
W71-10096 05C

DEVRIES, J. J.
POWER LOSSES AND FLOW TOPOLOGIES IN CONVERGING MANIFOLD,
W71-10397 08B

DIACONU, S.
THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (FRENCH L'INFLUENCE DES TRAVAUX D'AMENAGEMENT SUR LA MORPHOLOGIE DES BRAS DU DELTA DU DANUBE),
W71-10059 08B

DICKSON, KENNETH L.
REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
W71-09987 05C

DILL, WILLIAM A.
AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

DISKIN, M. H.
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10014 02A

DOLCETTA, M.
PROBLEMS WITH LARGE UNDERGROUND STATIONS IN ITALY,
W71-10402 08C

DOPONIN, YU. P.
THERMAL INTERACTION OF THE ATMOSPHERE AND THE HYDROSPHERE IN THE ARTIC (RUSSIAN TEPLOVOYE VZAIMODEYSTVIYE ATMOSFERY I GIDROSFERY V ARKTIKE),
W71-09962 02C

DRAGOTA, GH.
STUDIES OF THE DISPOSITION OF PARTIAL DISCHARGES OF BED LOAD UPSTREAM OF THE SULINA MOUTH (FRENCH ETUDES DES DISPOSITIFS DE DECHARGEMENT PARTIEL DU DEBIT SOLIDE EN AMONT DE L'EMBOUCHURE DE SULINA),
W71-10060 08B

DRONBUSH, JAMES N.
POLLUTION POTENTIAL OF LIVESTOCK FEEDING OPERATIONS IN SOUTH DAKOTA,
W71-10104 05D

DUCKSTEIN, LUCIEN
EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
W71-10314 07A

DUGAN, PATRICK R.
ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

DUMBLETON, MICHAEL JOHN
THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
W71-10031 02G

DVINOFF, A. H.
PHREATIC SURFACE LOCATION AFTER DRAWDOWN,
W71-10390 08D

DYSART, G. R.
BLAST-FRACTURING,
W71-10418 08A

EDDE, HOWARD
AN INTRODUCTION TO DETERMINATION OF ESTUARINE ASSIMILATIVE CAPACITY,
W71-10093 05B

EISLER, RONALD
PESTICIDES IN THE MARINE ENVIRONMENT,
W71-09992 05C

EL BOUSHI, ISMAIL M.
VARIATION OF SPECIFIC RETENTION IN RUBBLY ROCK PARTICLES,
W71-10019 02F

EL FAYOUMY, I.
REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
W71-10051 02F

ELFER, KARL
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

EL-SABBAN, F. F.
VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

ENGLAND, C. B.
COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
W71-10021 02A

ENGMAN, EDWIN T.
SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
W71-10028 02A

ERICKSON, J. MARK
WIND-ORIENTED GASTROPOD SHELLS AS INDICATORS OF PALEOWIND DIRECTION,
W71-10330 02J

EPYUZLU, N. E.
A DYNAMIC PROGRAMMING ALGORITHM FOR THE OPERATION OF THE GREAT LAKES,
W71-10076 06B

FEDOREY, V. G.
A SHORT-TERM FORECAST OF INFLOW TO THE RESERVOIR OF THE ZEYSKAYA HYDROELECTRIC POWER PLANT (KRATKOSROCHNYY PROGNOZ PRITOCHNOSTI V VODOKHRANILISHCHE ZEYSKOY GES),
W71-10347 04A

FERGUSON, DENZEL E.
LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS,
W71-10084 05C

FETH, J. H.
GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN THE GREAT BASIN, U.S.A.,
W71-10052 02F

FEUILLADE, J.
DEVELOPMENT OF PHYSICO-CHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS PRECEDING SUMMER STAGNATION IN A RESERVOIR (IN FRENCH),
W71-10087 05C

FIELD, MICHAEL E.
DEPOSITION OF DEEP-SEA SANDS COMPARISON OF TWO AREAS OF THE CAROLINA CONTINENTAL RISE,
W71-10328 02J

FINICHIU, MARCELLE
CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

FOLAYAN, J. I.
DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

FRANCO, JOHN J.
NAVIGATION CONDITIONS AT MILLERS FERRY LOCK AND DAM, ALABAMA RIVER, ALABAMA. HYDRAULIC MODEL INVESTIGATION,
W71-09999 08B

NAVIGATION CONDITIONS AT MCALPINE LOCKS AND DAM, OHIO RIVER. HYDRAULIC MODEL INVESTIGATION,
W71-10005 08B

NAVIGATION CONDITIONS AT COLUMBIA LOCK AND DAM, QUACHITA RIVER LOUISANA,
W71-10006 08B

FREAD, D. L.
OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
W71-10018 02E

FREAR, D. E. H.
VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

FRFA, JAMES I.
ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

FREDEEN, F. J. H.
RESIDUES OF DDT, DDE AND DDD IN FISH IN THE SASKATCHEWAN RIVER AFTER USING DDT AS A BLACKFLY LARVICIDE FOR TWENTY YEARS,
W71-10086 05C

FRYER, GLENN E.
SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
W71-10332 02J

FULTON, JEROME K.
INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
W71-09945 04A

GANEYEV, I. G.
GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K GEOKHIMII ALYUMINIYA V ZONE ENERGICHNOGO GIDROLITICHESKOGO RAZLOZHENIYA ALYUMOSILIKATOV V KORAKH VYVETRIVANIYA).
W71-10341 02K

GARTSMAN, I. N.
A CHANNEL NETWORK AND DESCRIPTIONS OF FLOOD RUNOFF ON RIVERS IN THE SOUTHERN PART OF THE SOVIET FAR EAST (RUSSIAN RUSLOVAYA SET' I KHARAKTERISTIKI PAVODOCHNOGO STOKA REK YUGA DAL'NEGO VOSTOKA),
W71-10185 02E

STORM FLOOD FORMATION PROCESSES (RUSSIAN PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
W71-10189 02E

GBUREK, WILLIAM J.
SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
W71-10028 02A

GEMMEL, ROBERT S.
GENERATED MONTHLY STREAMFLOWS FOR THE MIDWESTERN AND SOUTHWESTERN UNITED STATES,
W71-10321 02E

GENTRY, R. F.
VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

GIGER, M. W.
LIMIT ANALYSIS OF STABILITY OF SLOPES,
W71-10393 08D

GJORV, O. E.
LONG-TIME DURABILITY OF CONCRETE IN SEAWATER,
W71-10380 08F

GLIWICZ, ZBIGNIEW M.
THE FOOD SOURCES OF LAKE ZOOPLANKTON (IN POLISH),
W71-10094 05C

GLUBOKOV, V. N.
RELATIONSHIP BETWEEN ANNUAL RUNOFF OF RIVERS OF EASTERN SIBERIA AND THE SOVIET FAR EAST AND THE HEAT/MOISTURE RATIO (RUSSIAN ZAVISIMOST' GODOVOGO STOKA REK VOSTOCHNOY SIBIRI I DAL'NEGO VOSTOKA OT SOOTNOSHENIYA TEPLA I YLAGI),
W71-10188 02D

PRECIPITATION ADJUSTMENTS FOR RAIN-GAGE BUCKET WETTING (K VOPROSU O POPRAVKAKH K OSADKAM NA SMACHIVANIYE VEDRA),
W71-10348 02B

GOLDSTONE, SEYMOUR E.
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

GOODMAN, ALVIN S.
TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
W71-10326 05B

GORCHAKOV, A. M.
CALCULATING PRECIPITATION IN WATER BALANCE ESTIMATES (UCHET OSADKOV PRI VODNOBALANSOVYKH RASCHETAKH).
W71-10346 02B

GOYAL, S. K.
SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
W71-10070 05C

GRAHAM, J. B.
NEW TOOLS FOR NEW AND OLD WELLS,
W71-10422 08A

GRAY, M. W.
REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
W71-10369 05G

GREENE, D. SCOTT
THE TEXAS WATER QUALITY BOARD,
W71-10265 05G

GRIFFIN, WADE L.
ECONOMICS OF WATER POLLUTION CONTROL FOR CATTLE FEEDLOT OPERATIONS,
W71-10377 05G

GROENEWOUD, W. M.
TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

GRUB, W.
POULTRY DUST ORIGIN AND COMPOSITION,
W71-10110 05A

GUPTA, VULLI L.
CROSS SPECTRAL ANALYSIS OF PRECIPITATION AND STREAMFLOW DATA SYSTEMS,
W71-10037 07C

GUY, HAROLD P.
FLOOD FLOW DOWNSTREAM FROM SLIDE,
W71-10316 02J

HALL, FRANCIS R.
DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
W71-09942 05B

HANSEN, R. W.
CATTLE FEEDLOT WATER QUALITY HYDROLOGY,
W71-10373 05G

HARBAUGH, T. E.
OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
W71-10018 02E

HARDIN, JAY C.
STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
W71-10317 08B

HARMESON, ROBERT H.
EXISTING LEVELS OF NITRATES IN WATERS - THE ILLINOIS SITUATION,
W71-09956 05A

HARRISS, ROBERT C.
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

HARROLD, TOM
DISPOSAL OF HATCHERY WASTES,
W71-10364 05D

HARR, M. E.
PHREATIC SURFACE LOCATION AFTER DRAWDOWN,
W71-10390 08D

HARVEY, T. L.
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

HAVEN, DEXTER S.
TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

HAYES, D. W.
DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
W71-09950 02J

HAYNES, R. R.
THEORETICAL ANALYSIS OF THE EFFECTS OF AIR VOIDS IN CONCRETE,
W71-10381 08F

HAZEN, T. E.
PROPERTIES OF FARM ANIMAL EXCRETA,
W71-10109 05A

HEINDL, L. A.
HYDROLOGICAL MAPPING AND THE IHD,
W71-10030 07C

HEIN, FRANCES J.
BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

HELGESON, HAROLD C.
SILICATE-SEA WATER EQUILIBRIA IN THE OCEAN SYSTEM,
W71-09948 02K

HEMMEN, ELIZE H.
SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
W71-10332 02J

HEMPEL-ZAWITKOWSKA, J.
HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
W71-09991 05C

HENSLER, R. F.
EFFECT OF MANURE APPLICATION, AERATION, AND SOIL PH ON SOIL NITROGEN TRANSFORMATIONS AND ON CERTAIN SOIL TEST VALUES,
W71-10357 05D

HERSHFIELD, DAVID M.
PARAMETER ESTIMATION FOR WET-DAY SEQUENCES,
W71-10023 02B

HICKEY, J. L. S.
CAGE AND KENNEL WASTE WATER,
W71-10100 05A

HIDORE, JOHN J.
ANNUAL, SEASONAL, AND MONTHLY CHANGES IN RUNOFF IN THE UNITED STATES,
W71-10029 02E

HILL, JOHN W.
WTF PILOT PLANT ANNUAL REPORT FOR THE PERIOD ENDING JULY 1, 1968,
W71-09976 03A

HISE, EUGENE C.
WTF PILOT PLANT ANNUAL REPORT FOR THE PERIOD ENDING JULY 1, 1968,
W71-09976 03A

HOEG, K.
PRECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

HOLSTEIN, JOHN C.
STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
W71-10103 05C

HOPKINS, T. L.
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

HORNER, THEODORE W.
A STATISTICAL DATA PLAN FOR BOMEX,
W71-10033 02B

HOSHINO, H.
ESTIMATE OF FORCES EXERTED AGAINST SPACERS WHEN FAULTY CONDITION OCCURS,
W71-10409 08C

HOUSER, JOHN F.
LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
W71-10165 05G

HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

HOUSLEY, J. G.
EFFECTS OF HURRICANE BARRIER ON NAVIGATION CONDITIONS IN EAST PASSAGE, NARRAGANSETT BAY, RHODE ISLAND HYDRAULIC MODEL INVESTIGATION,
W71-10000 08B

HOWARD, ALAN D.
SIMULATION MODEL OF STREAM CAPTURE,
W71-10337 02E

HOWES, J. R.
POULTRY DUST ORIGIN AND COMPOSITION,
W71-10110 05A

HOYER, MARCUS C.
PUGET PEAK AVALANCHE, ALASKA.
W71-10335 02J

HUFSCHMIDT, MAYNARD M.
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

HUNT, BRUCE W.
VERTICAL RECHARGE OF UNCONFINED AQUIFER,
W71-10176 02G

HUTCHINS, J. S.
TEMPERATURE SURVEYS THE ART OF INTERPRETATION,
W71-10427 03B

INCHANA, A.
AGING OF OIL-FILLED CABLE DIELECTRICS,
W71-10404 08C

IRGENS, R. L.
LABORATORY STUDIES OF AEROBIC STABILIZATION OF SWINE WASTE,
W71-10106 05D

ISRAELSEN, EUGENE K.
QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
W71-09936 05B

IVANOV, V. V.
HYDRAULIC CALCULATION OF WATER DISCHARGE AND LEVELS IN RIVER DELTAS,
W71-10038 02E

JACKSON, DONALD R.
PARAMETER ESTIMATION IN HYDROLOGY THE STATE OF THE ART,
W71-10025 02F

JACKSON, H. ABLES
MODERNIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY HYDRAULIC MODEL INVESTIGATION,
W71-10001 08B

JACKSON, ROBERT A.
STABILITY OF PROPOSED BREAKWATER, BURNS WATERWAY HARBOR, INDIANA HYDRAULIC MODEL INVESTIGATION,
W71-10007 08B

DESIGNS FOR RUBBLE -MOUND BREAKWATERS, DANA POINT HARBOR, CALIFORNIA,
W71-10199 08B

JACKS, THOMAS W.
LOCAL AND REGIONAL WATER POLLUTION CONTROL IN TEXAS,
W71-10262 05G

JACOBS, J. D.
BETTER SPECIFICATIONS FOR UNDERGROUND WORK,
W71-10401 06B

JAMES, PETER MICHAEL
THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
W71-10032 08D

JAMISON, DONALD K.
JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
W71-10178 08B

JAWORSKI, N. A.
CAGE AND KENNEL WASTE WATER,
W71-10100 05A

JENSEN, EUGENE T.
AGRICULTURE AS A SOURCE OF WATER POLLUTION,
W71-10375 05G

JETTON, ELDON V.
A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
W71-10319 02B

JOHNSON, D. E.
CAVITATION PARAMETERS FOR OUTLET VALVES,
W71-10379 08B

JONES, C. W.
LABORATORY EVALUATIONS OF CANAL SOIL SEALANTS. AN OPEN AND CLOSED CONDUIT SYSTEMS INVESTIGATION OF FOUR PROPRIETARY MATERIALS PROPOSED AS CANAL SOIL SEALANTS ON SILTY SAND IN LABORATORY PERMEAMETERS,
W71-10201 08D

JONES, WALTER D.
NONDESTRUCTIVE WATER CONTENT DETERMINATION,
W71-10338 02G

JORDON, CLIFTON F., JR.
SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
W71-10332 02J

KADING, H. W.
TEMPERATURE SURVEYS THE ART OF INTERPRETATION,
W71-10427 03B

KADOUM, A. M.
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

KAGAN, R. S.
DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

KAGAYA, S.
AGING OF OIL-FILLED CABLE DIELECTRICS,
W71-10404 08C

KALTER, ROBERT J.
PLANNING ANALYSIS FOR THE NON-MARKET VALUES OF WATER RESOURCES WITH PARTICULAR EMPHASIS ON RECREATION,
W71-09944 06B

KAPITONOV, N. M.
PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (RUSSIAN FOTOGRAFICHESKIY METOD GRANULOMETRICHESKOGO ANALIZA KRUPNYKH NANOSOV),
W71-09966 02J

KEMP, A. L. W.
ORGANIC CARBON AND NITROGEN IN THE SURFACE SEDIMENTS OF LAKES ONTARIO, ERIE, AND HURON,
W71-10327 05A

KHAYDAROV, R. M.
DYNAMICS OF THE ILI RIVER DELTA (RUSSIAN DINAMIKA DEL'TY REKI ILI),
W71-09970 02J

KING, D. L.
REAERATION OF STREAMS AND RESERVOIRS ANALYSIS AND

BIBLIOGRAPHY,
W71-10202 05G

KING, W. L.
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

KIRILLIVA, E. P.
THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
W71-10046 02K

KIRKHAM, DON
AUGER HOLE SEEPAGE THEORY,
W71-10011 02G

KISIEL, CHESTER C.
EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
W71-10314 07A

KNUTSON, HERBERT
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

KOON, J.
POULTRY DUST ORIGIN AND COMPOSITION,
W71-10110 05A

KUCHMENT, L. S.
IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (IDENTIFIKATSIYA NELINEYNYKH GIDROLOGICHESKIKH SISTEM),
W71-10342 02F

KUENZLER, EDWARD J.
DISSOLVED ORGANIC PHOSPHORUS EXCRETION BY MARINE PHYTOPLANKTON,
W71-10083 05C

KULLBERG, RUSSELL G.
INTERRELATIONS OF SEVERAL ABIOTIC FACTORS AND THE HIGHER AQUATIC PLANTS IN A STREAM ECOSYSTEM,
W71-10036 05C

KYLE, JOHN B.
THE TEXAS WATER QUALITY BOARD,
W71-10265 05G

LANE, L. J.
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10014 02A

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

LAO, CHESTER
GROUND WATER RESOURCES AND DEVELOPMENT COASTAL PLAIN REGION ERH JEN CHI--KAOHSIUNG, TAIWAN,
W71-10163 02F

LARSON, T. E.
EXISTING LEVELS OF NITRATES IN WATERS - THE ILLINOIS SITUATION,
W71-09956 05A

LAURY, ROBERT L.
STREAM BANK FAILURE AND ROTATIONAL SLUMPING PRESERVATION AND SIGNIFICANCE IN THE GEOLOGIC RECORD,
W71-10334 02J

LELEY, V. K.
AN ELECTROMETRIC METHOD FOR THE DETERMINATION OF SOIL MOISTURE,
W71-10012 02G

LEONARD, R. A.
THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

LESHNIOWSKY, WALTER O.
ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

LESPERANCE, T. W.
MERCURY POLLUTION INTEREST IN IT NOW ON THE UPSWING,
W71-10088 05C

LEUNG, P. S.
NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
W71-09974 01B

LEUNG, YUK-MAAN
TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

LEVI, DONALD R.
STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
W71-10103 05C

LIND, OWEN T.
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

LINSLEY, RAY K.
HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
W71-10179 03B

LIPPER, R. I.
DESIGN FOR FEEDLOT WASTE MANAGEMENT - HISTORY AND CHARACTERISTICS,
W71-10371 05G

LIU, HENRY
WIND-INDUCED CIRCULATION IN SHALLOW WATER,
W71-10170 02E

LOCKETT, W. G.
THE DETERMINATION OF POWER BENEFITS FROM A MULTIPURPOSE WATER PROJECT,
W71-10383 06B

LOEHR, RAYMOND C.
CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
W71-09960 05B

LONG, T. A.
VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

LUMB, ALAN M.
HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
W71-10179 03B

LUM-SHUE-CHAN, K.
ATOMIC ABSORPTION DETERMINATION OF MICROGRAM QUANTITIES OF MOLYBDENUM IN LAKE WATERS,
W71-10077 07B

LYLO, V. M.
A STORM FLOOD HYDROGRAPH FORECAST BASED ON CHANNEL CONVEYANCE (RUSSIAN PROGNOZ GIDROGRAFA DOZHDEVYKH PAVODKOV S UCHETOM PROPUSKNOY SPOSOBNOSTI POYMENNOGO RUSLA),
W71-10183 04A

STORM FLOOD FORMATION PROCESSES (RUSSIAN PROTSESSY FORMIROVANIYA DOZHDEVYKH PAVODKOV),
W71-10189 02E

FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10345 04A

LYUBOMIROVA, K. S.
RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (RUSSIAN NEKOTORYYE REZUL'TATY LABORATORNYKH ISSLEDOVANIY SKOROSTEY DVIZHENIYA DONNYKJ NANOSOV),
W71-09967 02J

MACFARLANE, ROBERT B.
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

MACKAY, D. K.
THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
W71-10048 02C

ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
W71-10049 02C

MACKENZIE, FRED T.
SILICATE-SEA WATER EQUILIBRIA IN THE OCEAN SYSTEM,
W71-09948 02K

MACKIE, A. M.
AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE AGENTS,
W71-10211 05C

MAGEARN, G.
A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 08B

MANN, T. E.
AUTOMATION FOR SMALL IRRIGATION PROJECTS,
W71-10391 03F

MARTIN, C. SAMUEL
FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
W71-10174 08B

MARTIN, R. B.
THEORETICAL ANALYSIS OF THE EFFECTS OF AIR VOIDS IN CONCRETE,
W71-10381 08F

MARTIN, SAMUEL C.
SEEPAGE FORCE ON INTERFACIAL BED PARTICLES,
W71-09943 02J

MAYER, JACK
DIGESTION OF OYSTERS FOR THE DETERMINATION OF MERCURY,
W71-10092 05A

MCCLURG, CHARLES A.
THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
W71-10355 05D

MCFARLAN, ANDREW J.
SPECIES DIVERSITY SPECIES ABUNDANCE OF FISH POPULATIONS AN EXAMINATION OF VARIOUS METHODS,
W71-10210 07C

MCGAUHEY, P. H.
NITRATES IN WATER SUPPLIES - THE PROBLEM,
W71-09953 05B

MCKELLAR, CODY D., JR.
NAVIGATION CONDITIONS AT MCALPINE LOCKS AND DAM, OHIO RIVER. HYDRAULIC MODEL INVESTIGATION,
W71-10005 08B

MCSPARRAN, JOHN E.
REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
W71-10320 04A

MEISHEIMER, EDWIN S.
OUTLET STRUCTURE FOR EAU GALLE RESERVOIR, EAU GALLE RIVER, WISCONSIN, HYDRAULIC MODEL INVESTIGATION,
W71-09908 08B

MEL'NIKOVA, Z. D.
FORECASTING VOLUME OF RUNOFF AND PEAK FLOW OF SMALL RIVERS (PROGNOZ OB'YEMA I MAKSIMAL'NOGO STOKA MALYKH REK),
W71-10345 04A

MIKOPSKY, JOSEPH A.
SPECIES DIVERSITY SPECIES ABUNDANCE OF FISH POPULATIONS AN EXAMINATION OF VARIOUS METHODS,
W71-10210 07C

MILSTEAD, ROBIN J.
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

MINK, JOHN F.
GROUND WATER RESOURCES AND DEVELOPMENT COASTAL PLAIN REGION ERH JEN CHI--KAOHSIUNG, TAIWAN,
W71-10163 02F

MISHU, L. F.
CAPACITANCE TECHNIQUES FOR RADIAL DEFORMATIONS,
W71-10407 08D

MOHAN RAO, UDAYAGIRI
ANALYSIS OF SEDIMENTATION DATA,
W71-10315 02J

MOLHOLM, LOIS
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

MOWER, R. W.
GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN THE GREAT BASIN, U.S.A.,
W71-10052 02F

MUIR, D. M.
ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
W71-10428 03B

MURPHY, PATRICK E.
ENVIRONMENTAL LAW NEW LEGAL CONCEPTS IN THE ANTIPOLLUTION FIGHT,
W71-10118 05G

MURPHY, THOMAS E.
MODERNIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY HYDRAULIC MODEL INVESTIGATION,
W71-10001 08B

CONTROL STRUCTURE, LITTLE SIOUX RIVER, IOWA, HYDRAULIC MODEL INVESTIGATION,
W71-10002 08B

DROP STRUCTURE FOR GERING VALLEY PROJECT, SCOTTSBLUFF COUNTY, NEBRASKA HYDRAULIC MODEL INVESTIGATION,
W71-10004 08B

MUKHAYEVA, V. E.
ABSENCE OF DOWNSTREAM TRANSPORT OF ALLUVIUM BY DOWNCUTTING RIVERS, AS ILLUSTRATED BY THE GAR' RIVER (OTSUTSTVIYE PRODOL'NOGO PERENOSA ALLYUVIYA VREZAYUSHCHEYSYA REKI NA PRIMERE R. GAR'),
W71-10352 02J

NAQVI, SYED M.
LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS,
W71-10084 05C

NASTASE, V.
CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

NEGRU, R.
THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (FRENCH L'INFLUENCE DES TRAVAUX D'AMENAGEMENT SUR LA MORPHOLOGIE DES BRAS DU DELTA DU DANUBE),
W71-10059 08B

NELSON, B. F.
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

NELSON, S. D.
SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
W71-10387 03F

NEUMAN, SHLOMO P.
VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
W71-10318 02F

NIXON, RICHARD M.
OCEAN POLLUTION MESSAGE,
W71-10132 06E

NORMARK, W. R.
CHANNEL PIRACY ON MONTEREY DEEP-SEA FAN,
W71-09947 02J

NORTON, T. E.
CATTLE FEEDLOT WATER QUALITY HYDROLOGY,
W71-10373 05G

OEY, HONG S.
A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
W71-10319 02B

OLARU, H.
SEDIMENTATION--ANNOTATED BIBLIOGRAPHY OF FOREIGN LITERATURE FOR 1968 AND 1969, SURVEY NO. 6,
W71-10034 02J

OLSEN, R. J.
EFFECT OF MANURE APPLICATION, AERATION, AND SOIL PH ON SOIL NITROGEN TRANSFORMATIONS AND ON CERTAIN SOIL TEST VALUES,
W71-10357 05D

OPLOE, GERALD T.
WATER QUALITY MODELING OF ESTUARIES,
W71-10047 05G

OSBORN, H. B.
DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

OVERTON, D. E.
ESTIMATION OF SURFACE WTER LAG TIME FROM THE KINEMATIC WAVE EQUATIONS,
W71-10022 02E

OWENS, T. R.
ECONOMICS OF WATER POLLUTION CONTROL FOR CATTLE FEEDLOT OPERATIONS,
W71-10377 05G

PAINTER, DAVID J.
DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
W71-10177 08B

PARKIN, A. K.
FIELD SOLUTIONS FOR TURBULENT SEEPAGE FLOW,
W71-10394 08D

PARMELE, LESLIE H.
SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
W71-10028 02A

PATCHICK, P. F.
ESTIMATING WATER WELL SPECIFIC CAPACITY UTILIZING PERMEABILITY OF DISTURBED SAMPLES,
W71-10421 08A

PATTERSON, F. W.
THE DETERMINATION OF POWER BENEFITS FROM A MULTIPURPOSE WATER PROJECT,
W71-10383 06B

PATTON, J.
SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

PAUL, J.
QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
W71-09936 05B

PAYNE, C. G.
THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
W71-10105 05C

PENTLAND, R. L.
A DYNAMIC PROGRAMMING ALGORITHM FOR THE OPERATION OF THE GREAT LAKES,
W71-10076 06B

PERIZ, HIMERIO J.
WIND-INDUCED CIRCULATION IN SHALLOW WATER,
W71-10170 02E

PEROV, V. F.
MUD FLOW OCCURRENCES IN THE RSFSR (RASPROSTRANENIYE SELEY NA TERRITORII RSFSR),
W71-10351 02J

PETRESCU, V.
CERTAIN ASPECTS OF THE INFLUENCE ON THE HYDROLOGIC REGIME OF HYDRAULIC WORKS FOR THE IMPROVEMENT OF NAVIGATION IN THE DANUBE DELTA (FRENCH CERTAINS ASPECTS DE L'INFLUENCE SUR

LE REGIME HYDROLOGIQUE DES TRAVAUX HYDRAULIQUES EFFECTUES POUR L'AMELIORATION DE LA NAVIGATION DANS LE DELTA DU DANUBE),
W71-10058 08B

PFISTER, ROBERT M.
ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

PILKEY, ORRIN H.
DEPOSITION OF DEEP-SEA SANDS COMPARISON OF TWO AREAS OF THE CAROLINA CONTINENTAL RISE,
W71-10328 02J

BIOCLASTIC TURBIDITE SEDIMENTATION IN COLUMBUS BASIN, BAHAMAS,
W71-10336 02J

PODANI, M.
INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

POLTORACKA, JOZEFA
PHYTOPLANKTON COEFFICIENTS AS A METHOD OF DEFINING THE DEGREE TO WHICH WATER HABITATS ARE TROPHIC (IN POLISH),
W71-10075 05C

PONOMAREVA, T. G.
CALCULATIONS OF PEAK DISCHARGE OF FLOOD RUNOFF ON RIVERS OF THE AMUR BASIN USING THE METHOD OF ADJUSTMENT (RUSSIAN RASCHETY MAKSIMAL'NYKH RASKHODOV PAVODOCHNOGO STOKA REK BASSEYNA AMURA PO METODU KORREKTSII),
W71-10184 04A

POON, CALVIN P. C.
METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

POPOVA, E. A.
A STORM FLOOD HYDROGRAPH FORECAST FOR RIVERS ON THE MARITIME TERRITORY FROM RUNOFF OF REPRESENTATIVE BASINS (METODIKA PROGNOZA GIDROGRAFA DOZHDEVYKH PAVODKOV REK PRIMOR'YA NA OSNOVE UCHETA STOKA POKAZATEL'NYKH BASSEYNOV),
W71-10344 04A

POPOV, I. V.
MORPHOLOGICAL CHARACTERISTICS OF BRAIDED RIVER CHANNELS IN AN AREA OF TRIBUTARY INFLOW (K VOPROSU O MORFOLOGICHESKIKH OSOBENNOSTYAKH MNOGORUKAVNYKH RECHNYKH RUSEL NA UCHASTKE VPADENIYA PRITOKA),
W71-10343 02J

POSEY, CHESLEY J.
PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
W71-10175 08A

POYTON, R. O.
THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
W71-10090 05C

PRATI, L.
WATER POLLUTION AND SELF-PURIFICATION STUDY ON THE PO RIVER BELOW FERRARA,
W71-10324 05B

PRINGLE, BENJAMIN H.
TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

RADEMACHER,
ANIMAL WASTE RUNOFF - A MAJOR WATER QUALITY CHALLENGE,
W71-10367 05G

RANDLES, CHESTER I.
ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

RARICK, JOSEPH F.
OKLAHOMA WATER LAW, STREAM AND SURFACE, THE WATER CONSERVATION STORAGE COMMISSION AND THE 1965 AND 1967 AMENDMENTS,
W71-10215 06E

RENARD, K. G.
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10014 02A

RESNIK, A. V.
ANIMAL WASTE RUNOFF - A MAJOR WATER QUALITY CHALLENGE,
W71-10367 05G

REVINA, S. K.
THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
W71-10046 02K

RICHARDSON, Q. B.
WATER POLLUTION AND SELF-PURIFICATION STUDY ON THE PO RIVER BELOW FERRARA,
W71-10324 05B

RICH, PETER H.
A SIMPLE, SENSITIVE UNDERWATER PHOTOMETER,
W71-10089 07B

RIFAI, MAHMOUD FAISAL
FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
W71-10173 08B

RILEY, J. P.
THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
W71-09982 05A

ROBECK, GORDON G.
TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
W71-09961 05B

ROBERTSON, ROBERT A.
MODEL STUDY OF POWER INTAKE GATE OF MOSSYROCK DAM,
W71-10168 08C

ROBOHN, WALTER F.
MAJOR PROBLEMS OF WATER POLLUTION CREATED BY AGRICULTURAL PRACTICES,
W71-10374 05G

ROFAIL, NABIL
THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
W71-10053 02F

ROGERS, JERRY R.
GENERATED MONTHLY STREAMFLOWS FOR THE MIDWESTERN AND SOUTHWESTERN UNITED STATES,
W71-10321 02E

ROLLINS, MYRON B.
A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
W71-10415 04A

ROLLO, C. A.
POULTRY DUST ORIGIN AND COMPOSITION,
W71-10110 05A

ROMANOVSKIY, V. V.
PHOTOGRAPHIC METHOD OF COARSE SEDIMENT GRAIN-SIZE ANALYSIS (RUSSIAN FOTOGRAFICHESKIY METOD GRANULOMETRICHESKOGO ANALIZA KRUPNYKH NANOSOV),
W71-09966 02J

ROSSINSKIY, K. I.
THE MOVEMENT OF BOTTOM SEDIMENTS (RUSSIAN DVIZHENIYE DONNYKH NANOSOV),
W71-09969 02J

TENTATIVE LABORATORY INVESTIGATION OF DIVAGATING-RIVER BANK DESTRUCTION (RUSSIAN OPYT ISSLEDOVANIYA V LABORATORNYKH USLOVIYAKH RAZRUSHENIYA BEREGOV (DEYGISHA) NA BLUZHDAYUSHCHIKH REKAKH),
W71-09971 02J

ROUSSEAU, D. L.
'POLYWATER' AND SWEAT SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

ROVENTA, V.
DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL(FRENCH DONNEES SUR LES CHARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

ROYER, L. M.
RESIDUES OF DDT, DDE AND DDD IN FISH IN THE SASKATCHEWAN RIVER AFTER USING DDT AS A BLACKFLY LARVICIDE FOR TWENTY YEARS,
W71-10086 05C

ROZELLE, L. T.
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

RUBEN, ERNEST
PRIMARY PRODUCTION DEPRESSION OF OXYGEN EVOLUTION IN ALGAL CULTURES BY ORGANOPHOSPHORUS INSECTICIDES,
W71-10096 05C

RYBAK, JAN IGOR
A REVIEW OF STUDIES ON THE BOTTOM SEDIMENTS OF LAKES (IN POLISH),
W71-10095 05C

SAFFORD, G. J.
NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
W71-09974 01B

SAHA, J. G.
RESIDUES OF DDT, DDE AND DDD IN FISH IN THE SASKATCHEWAN RIVER AFTER USING DDT AS A BLACKFLY LARVICIDE FOR TWENTY YEARS,
W71-10086 05C

SALOMON, MILTON
PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,
W71-10207 05C

SANBORN, S. M.
NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND

ICNTC SOLUTIONS,
W71-09974 01B

SAWARKAR, N. J.
AN ELECTROMETRIC METHOD FOR THE DETERMINATION OF SOIL MOISTURE,
W71-10012 02G

SAWYER, CLAIR N.
THE NITROGEN CYCLE.
W71-09954 05B

SAYRE, WILLIAM W.
LONGITUDINAL DISPERSION OF BED-MATERIAL PARTICLES,
W71-10169 02J

SCHEFFERLE, HENRIETTA E.
THE DECOMPOSITION OF URIC ACID IN BUILT UP POULTRY LITTER,
W71-10107 05B

SCHTEINMANN, E. S.
METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
W71-10045 02L

SCHUSTER, CARL N.
TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

SCHWARTZ, W. A.
SOIL CHEMICAL CHANGES AND INFILTRATION RATE REDUCTION UNDER SEWAGE SPREADING,
W71-10138 05B

SEGAR, D. A.
THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
W71-09982 05A

SELLERS, J. B.
THE MEASUREMENT OF ROCK STRESS CHANGES USING HYDRAULIC BOREHOLE GAGES,
W71-10408 08E

SENECHAL, A. J.
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

SHAMPINE, WILLIAM J.
SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
W71-09946 05B

SHATA, A.
REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
W71-10051 02F

SHEVLEVA, G. G.
RESULTS OF LABORATORY INVESTIGATIONS OF BED-LOAD MOVEMENT VELOCITIES (RUSSIAN NEKOTORYYE REZUL'TATY LABORATORNYKH ISSLEDOVANIY SKOROSTEY DVIZHENIYA DONNYKJ NANOSOV),
W71-09967 02J

TENTATIVE LABORATORY INVESTIGATION OF DIVAGATING-RIVER BANK DESTRUCTION (RUSSIAN OPYT ISSLEDOVANIYA V LABORATORNYKH USLOVIYAKH RAZRUSHENIYA BEREGOV (DEYGISHA) NA BLUZHDAYUSHCHIKH REKAKH),
W71-09971 02J

SHIAO, YU
REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
W71-10320 04A

SHILINA, I. I.
FORECASTING FLOOD RUNOFF USING UNIT-FUNCTION TRANSFORMATIONS (RUSSIAN PROGNOZ STOKA PAVODKOV PO ELEMENTARNYM TRANSFORMATSIONNYM FUNKTSIYAMI),
W71-10182 04A

SHIRLEY, WILLIAM D.
TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

SHOWS, LOUIS J.
NAVIGATION CONDITIONS AT MILLERS FERRY LOCK AND DAM, ALABAMA RIVER, ALABAMA. HYDRAULIC MODEL INVESTIGATION,
W71-09999 08B

NAVIGATION CONDITIONS AT COLUMBIA LOCK AND DAM, OUACHITA RIVER LOUISANA,
W71-10006 08B

SHUBINSKI, ROBERT P.
WATER QUALITY MODELING OF ESTUARIES,
W71-10047 05G

SHUYSKIY, YU. D.
WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (POSSYPI SIOYA VOLNOVOY PERERABOTKI I IKH GENETICHESKIYE OSOBENNOSTI).
W71-10340 02J

SIMBOTIN, A.
CERTAIN ASPECTS OF THE INFLUENCE ON THE HYDROLOGIC REGIME OF HYDRAULIC WORKS FOR THE IMPROVEMENT OF NAVIGATION IN THE DANUBE DELTA (FRENCH CERTAINS ASPECTS DE L'INFLUENCE SUR LE REGIME HYDROLOGIQUE DES TRAVAUX HYDRAULIQUES EFFECTUES POUR L'AMELIORATION DE LA NAVIGATION DANS LE DELTA DU DANUBE),
W71-10058 08B

SIMONOV, A. I.
THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
W71-10046 02K

SINGH NAGPAL, UJJAL
SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
W71-10070 05C

SIRIYONG, SUVIT
SURFACE DISTURBANCE FROM SUBMERGED JET,
W71-10171 08B

SMITH, GEORGE E.
POLLUTION - HOW MUCH OF A PROBLEM COMES FROM FERTILIZERS,
W71-10099 05C

SMITH, G. E.
MANAGEMENT OF ANIMAL FEEDLOT WASTES -- LAND SPREADING AS A DISPOSAL PROCESS,
W71-10370 05G

CONTRIBUTION OF FERTILIZERS TO WATER POLLUTION,
W71-10372 05G

SMITH, KENNETH V. H.
FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
W71-10173 08B

SMITH, LYNWOOD S.
BUILDING AND OPERATING A FLOATING LABORATORY,
W71-09986 09C

SMITH, NORMAN D.
BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

SMITH, RODERICK M.
CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER FLOUNDER, PSEUDO-PLEURONECTES AMERICANUS, FROM THE NEWEANTIC RIVER ESTUARY, MASSACHUSETTS,
W71-10212 05C

SMITH, T. F.
EFFECT OF AGRICULTURE ON WATER QUALITY,
W71-10376 05G

SNISHCHENKO, B. F.
MORPHOLOGICAL CHARACTERISTICS OF BRAIDED RIVER CHANNELS IN AN AREA OF TRIBUTARY INFLOW (K VOPROSU O MORFOLOGICHESKIKH OSOBENNOSTYAKH MNOGORUKAVNYKH RECHNYKH RUSEL NA UCHASTKE VPADENIYA PRITOKA),
W71-10343 02J

SOULIE, M.
TECHNIQUE FOR STUDY OF GRANULAR MATERIALS,
W71-10405 08D

SOUTH, G. ROBIN
A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
W71-10066 05C

SPAHR, S. L.
ANIMAL WASTE DISPOSAL BECOMES A MORE DIFFICULT PROBLEM,
W71-10362 05D

SPANGLER, D. P.
ESTIMATING STORAGE CAPACITY IN DEEP ALLUVIUM BY GRAVITY-SEISMIC METHODS,
W71-10384 02F

SPATARU, A.
A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 08B

THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (FRENCH L'INFLUENCE DES TRAVAUX D'AMENAGEMENT SUR LA MORPHOLOGIE DES BRAS DU DELTA DU DANUBE),
W71-10059 08B

SPENCER, A. M.
BLAST-FRACTURING,
W71-10418 08A

SPRAGUE, J. B.
MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
W71-09989 05C

SPRINER, MARIE
CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

SREENIVASAN, P. S.
A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
W71-10015 02B

STALL, JOHN B.
NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,

W71-10010 07C

STATE, I.
DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL(FRENCH DONNEES SUR LES CHARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

STEPANOVA, A. I.
SEDIMENT DISCHARGE OF RIVERS IN THE MARITIME TERRITORY (RUSSIAN STOK NANOSOV REK PRIMORSKOGO KRAYA),
W71-09965 02J

STEPHEN, L. LAU
GROUND WATER RESOURCES AND DEVELOPMENT COASTAL PLAIN REGION ERH JEN CHI--KAOHSIUNG, TAIWAN,
W71-10163 02F

STERNBERG, YARON M.
PARAMETER ESTIMATION FOR AQUIFER EVALUATION,
W71-10028 02F

STIFF, M. J.
COPPER/BICARBONATE EQUILIBRIA IN SOLUTIONS OF BICARBONATE ION AT CONCENTRATIONS SIMILAR TO THOSE FOUND IN NATURAL WATER,
W71-10323 05A

STORM, DAVID RUSSELL
MANAGEMENT STUDY OF A TRANSITIONAL DELTA SYSTEM,
W71-10057 04A

STRAMEL, G. J.
MAINTENANCE OF WELL EFFICIENCY,
W71-10432 08A

STRAWN, KIRK
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

STREETER, V. L.
TRANSIENTS IN PIPELINES CARRYING LIQUIDS OR GASES,
W71-10395 08B

STRUFE, R.
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
W71-09995 05A

LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
W71-09997 05A

SUTHERLAND, ALEX J.
DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
W71-10177 08B

SWEET, ARNOLD L.
STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
W71-10317 08B

SWITHENBANK, COLIN
IDENTIFICATION OF METABOLITES OF N - (1, 1-DIMETHYLPROPYNYL) - 3,5 DICHLOROBENZAMIDE IN RAT AND COW URINE AND RAT FECES,
W71-10356 05A

SWOYER, GLEN F.
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

SYMONS, JAMES M.
URBAN SOURCES OF NITRATES,
W71-09959 05B

TADROS, SOFIA
THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
W71-10053 02F

TAIGANIDES, E. P.
PROPERTIES OF FARM ANIMAL EXCRETA,
W71-10109 05A

TAN, K. H.
THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

TENYAKOV, V. A.
GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K GEOKHIMII ALYUMINIYA V ZONE ENERGICHNOGO GIDROLITICHESKOGO RAZLOZHENIYA ALYUMOSILIKATOV V KORAKH VYVETRIVANIYA).
W71-10341 02K

THOMAS, JIMMIE L.
QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
W71-09936 05B

THOMAS, R. E.
SOIL CHEMICAL CHANGES AND INFILTRATION RATE REDUCTION UNDER SEWAGE SPREADING,
W71-10108 05B

TIMCHENKO, V. N.
HEAT FLOW TO MELTING ICE ON THE USSURI RIVER (TEPLOPRIKHOD K TAYUSHCHEMU L'DU REKI USSURI),
W71-10349 02C

TSERNOGLOU, D.
PARTICLE SIZE, WATER-STABLE AGGREGATES, AND BACTERIAL POPULATIONS IN LAKE SEDIMENTS,
W71-10069 05C

TUCKER, RICHARD J.
TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
W71-10326 05B

TUMEL', N. V.
MUD FLOW OCCURRENCES IN THE RSFSR (RASPROSTRANENIYE SELEY NA TERRITORII RSFSR),
W71-10351 02J

TURK, L. J.
BEST WELL DEPTH IN CRYSTALLINE ROCKS,
W71-10420 08A

URBAN, JAMES B.
SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
W71-10028 02A

VAGIN, N. F.
THE LAWS OF ICE PROCESSES IN DELTAS,
W71-10042 02C

VAIL, A. J.
THE SELETAR SCHEME, SINGAPORE,
W71-10382 03B

VAN DER MADE, J. W.
DESIGN LEVELS IN THE TRANSITION ZONE BETWEEN THE TIDAL REACH AND THE RIVER REGIME REACH,
W71-10039 08B

VAN DER WAARDEN, M.
TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

VAS'KOVSKIY, M. G.
CALCULATING THE WATER BALANCE OF LAKE KHANKA (RUSSIAN K RASCHETU VODNOGO BALANSA OZ. KHANKA),
W71-10186 02H

VAZHNOV, A. N.
VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (IZMENCHIVOST' VNUTRIGODOVOGO RASPREDELENIYA STOKA REK VOSTOCHNOGO ZAKAVKAZ'YA),
W71-10354 02E

VENKATARAMAN, G. S.
SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
W71-10070 05C

VIETS, FRANK G., JR.
THE MOUNTING PROBLEM OF CATTLE FEEDLOT POLLUTION,
W71-10111 05G

VILLEMONTE, JAMES R.
JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
W71-10178 08B

WAGNER, JAMES R.
ENVIRONMENT REPORT--BILLS TO AUTHORIZE CLASS ACTIONS RECOGNIZE RIGHT TO CLEAN ENVIRONMENT,
W71-10274 06E

WALCH, ANDREW F.
POLLUTION OF THE HIGH SEAS RESULTING FROM DRILLING AND PRODUCING OPERATIONS--FEDERAL JURISDICTION AND OPERATOR LIABILITY,
W71-10112 05G

WALLACE, D. E.
ESTIMATING STORAGE CAPACITY IN DEEP ALLUVIUM BY GRAVITY-SEISMIC METHODS,
W71-10384 02F

WALLS, ROBERT E.
PESTICIDE POLLUTION,
W71-10264 05G

WARD, PAUL C.
EXISTING LEVELS OF NITRATES IN WATER - THE CALIFORNIA SITUATION,
W71-09955 05B

WARD, R. C.
MEASURING EVAPOTRANSPIRATION A REVIEW,
W71-10013 02D

WARNER, D. A.
SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

WARNER, LARKIN
LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

WATSON, JOHN R.
THE TEXAS WATER QUALITY BOARD,
W71-10265 05G

WEATHERLEY, A. H.
EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

WEST, GRAHAM,
THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
W71-10031 02G

WETZEL, ROBERT G.
DISSOLVED ORGANIC MATTER AND PHYTOPLANKTONIC PRODUCTIVITY IN MARL LAKES,
W71-10079 05C

RECENT AND POSTGLACIAL PRODUCTION RATES OF A MARL LAKE,
W71-10080 05C

A SIMPLE, SENSITIVE UNDERWATER PHOTOMETER,
W71-10089 07B

DISSOLVED ORGANIC COMPOUNDS AND THEIR UTILIZATION IN TWO MARL LAKES,
W71-10091 05C

WHITCOMB, JAMES B.
TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

WHITE, DAVID E.
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

WHITMAN, IRA L.
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

WILKINSON, S. R.
THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

WILKINS, J. K.
A THEORY FOR THE SHEAR STRENGTH OF ROCKFILL,
W71-10403 08D

WILSON, HOWARD B.
SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN HYDRAULIC MODEL INVESTIGATION,
W71-10008 08B

W71-10009 08B

WINDISCH, S. J.
TECHNIQUE FOR STUDY OF GRANULAR MATERIALS,
W71-10405 08D

WINN, W. P.
CAVITATION PARAMETERS FOR OUTLET VALVES,
W71-10379 08B

WINTON, ELLIOT F.
THE HEALTH EFFECTS OF NITRATES IN WATER (PANEL DISCUSSION),
W71-09957 05B

WISE, JACK D.
PAHRUMP FIELD LABORATORY,
W71-10414 03F

WITHERSPOON, PAUL A.
VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
W71-10318 02F

WOODS, CALVIN E.
A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
W71-10319 02B

WUYCHECK, JOHN C.
ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (WITH GERMAN SUMMARY),
W71-10064 05C

YAMAMOTO, T.
AGING OF OIL-FILLED CABLE DIELECTRICS,
W71-10404 08C

YANG, CHIH TED
NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,
W71-10010 07C

LONGITUDINAL DISPERSION OF BED-MATERIAL PARTICLES,
W71-10169 02J

YEH, WILLIAM W-G
AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
W71-09938 06A

YIH, ROY Y.
IDENTIFICATION OF METABOLITES OF N - (1, 1-DIMETHYLPROPYNYL) - 3,5 DICHLORBENZAMINE IN RAT AND COW URINE AND RAT FECES,
W71-10356 05A

YOUNGS, E. G.
OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

ZABIK, MATTHEW J.
THE CONTRIBUTION OF URBAN AND AGRICULTURAL PESTICIDE USE TO THE CONTAMINATION OF THE RED CEDAR RIVER,
W71-10035 05B

ZAMFIR, GHEORGHE
CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

ZATUCHNAYA, B. M.
THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
W71-10046 02K

ZAVIALOV, I.
INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

ZHUKOVSKIY, S. YA.
EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (VLIYANIYE EROZIONNOGO VREZA RECHNYKH DOLIN NA RAZVITIYE KARSTA),
W71-10353 02J

ZIL'BERSHTEYN, I. A.
TWO STAGES IN THE FORMATION OF ICE-LENSES ON FROZEN RIVERS (O DVUKH STADIYAKH FORMIROVANIYA NALEDEY NA PROMERZAYUSHCHIKH REKAKH),
W71-10350 02C

ZINDEL, HOWARD C.
RECYCLED POULTRY NUTRIENTS,
W71-10365 05D

ZOELLER, W. A.
ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
W71-10428 03B

ZOVNE, JEROME J.
FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
W71-10174 08B

ORGANIZATIONAL INDEX

AGRICULTURAL RESEARCH SERVICE, BELTSVILLE, MD. HYDROGRAPH LAB.
COMPONENT TESTING WITHIN A COMPREHENSIVE WATERSHED MODEL,
W71-10021 02A

ESTIMATION OF SRUFACE WTER LAG TIME FROM THE KINEMATIC WAVE EQUATIONS,
W71-10022 02E

PARAMETER ESTIMATION FOR WET-DAY SEQUENCES,
W71-10023 02B

AGRICULTURAL RESEARCH SERVICE, RENO, NEV. SOIL AND WATER CONSERVATION RESEARCH DIV AND NEVADA UNIV., RENO. NEVADA AGRICULTURAL EXPERIMENT STATION.
A WAY TO SAVE WATER. CONTROLLING SEEPAGE WITH PLAYA SEDIMENTS,
W71-10415 04A

AGRICULTURAL RESEARCH SERVICE, TUCSON, ARIZ.
ESTIMATING STORAGE CAPACITY IN DEEP ALLUVIUM BY GRAVITY-SEISMIC METHODS,
W71-10384 02F

AGRICULTURAL RESEARCH SERVICE, TUCSON, ARIZ. SOUTHWEST WATERSHED RESEARCH CENTER.
INPUT-OUTPUT RELATIONSHIPS FOR AN EPHEMERAL STREAM CHANNEL SYSTEM,
W71-10014 02A

DETERMINING SIGNIFICANCE AND PRECISION OF ESTIMATED PARAMETERS FOR RUNOFF FROM SEMIARID WATERSHEDS,
W71-10027 02A

AGRICULTURAL RESEARCH SERVICE, UNIVERSITY PARK, PENN. NORTHEAST WATERSHED RESEARCH CENTER.
SCALE PROBLEMS IN INTERDISCIPLINARY WATER RESOURCES INVESTIGATION,
W71-10028 02A

AKADEMIYA NAUK SSSR, MOSCOW. INSTITUT OKEANOLOGII.
WAVE-FORMED PLACER DEPOSITS AND THEIR GENETIC CHARACTERISTICS (ROSSYPI SLOYA VOLNOVOY PERERABOTKI I IKH GENETICHESKIYE OSOBENNOSTI).
W71-10340 02J

ALABAMA WATER IMPROVEMENT COMMISSION, MONTGOMERY.
WATER QUALITY CRITERIA.
W71-10271 05G

SOME ASPECTS OF THE ALABAMA WATER IMPROVEMENT COMMISSION'S PROGRAM FOR CONTROL OF WATER POLLUTION.
W71-10272 05G

ALL-UNION DESIGNING, SURVEYING AND SCIENTIFIC RESEARCH INST., LENINGRAD (USSR).
EFFECT OF EROSIONAL DOWNCUTTING OF RIVER VALLEYS ON KARST DEVELOPMENT (VLIYANIYE EROZIONNOGO VREZA RECHNYKH DOLIN NA RAZVITIYE KARSTA),
W71-10353 02J

ALL-UNION SCIENTIFIC RESEARCH INST. OF HYDROGEOLOGY AND ENGINEERING GEOLOGY, MOSCOW (USSR).
HYDROGEOLOGY OF THE USSR VOLUME 34, THE KARAGANDA OBLAST (RUSSIAN GIDROGEOLOGIYA SSSR TOM XXXIV, KARAGANDINSKAYA OBLAST),
W71-09963 02F

AMERICAN SOCIETY OF CIVIL ENGINEERS, NEW YORK.
CHAPTER III. SEDIMENT MEASUREMENT TECHNIQUES3 RESERVOIR DEPOSITS.
W71-10392 07B

ARIZONA UNIV., TUCSON.
EFFICIENCY OF HYDROLOGIC COLLECTION SYSTEMS ROLE OF TYPE I AND II ERRORS,
W71-10314 07A

ARKTICHESKII I ANTARKTICHESKII NAUCHNO-ISSLEDOVATELSKII INSTITUT, LENINGRAD (USSR)
THERMAL INTERACTION OF THE ATMOSPHERE AND THE HYDROSPHERE IN THE ARTIC (RUSSIAN TEPLOVOYE VZAIMODEYSTVIYE ATMOSFERY I GIDROSFERY V ARKTIKE),
W71-09962 02C

HYDRAULIC CALCULATION OF WATER DISCHARGE AND LEVELS IN RIVER DELTAS,
W71-10038 02E

RESULTS OF AERODYNAMICAL MODELLING OF THE WATER REGIME OF DELTAS,
W71-10061 08B

ARMY CORPS OF ENGINEERS, VICKSBURG, MISS AND PURDUE UNIV., LAFAYETTE, IND.
PHREATIC SURFACE LOCATION AFTER DRAWDOWN,
W71-10390 08D

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
OUTLET STRUCTURE FOR EAU GALLE RESERVOIR, EAU GALLE RIVER, WISCONSIN, HYDRAULIC MODEL INVESTIGATION,
W71-09998 08B

NAVIGATION CONDITIONS AT MILLERS FERRY LOCK AND DAM, ALABAMA RIVER, ALABAMA. HYDRAULIC MODEL INVESTIGATION,
W71-09999 08B

EFFECTS OF HURRICANE BARRIER ON NAVIGATION CONDITIONS IN EAST PASSAGE. NARRAGANSETT BAY, RHODE ISLAND HYDRAULIC MODEL INVESTIGATION,
W71-10000 08B

MODERNIZATION OF FILLING AND EMPTYING SYSTEM, EXISTING MCALPINE LOCK (OLD NO. 41), OHIO RIVER, LOUISVILLE, KENTUCKY HYDRAULIC MODEL INVESTIGATION,
W71-10001 08B

CONTROL STRUCTURE, LITTLE SIOUX RIVER, IOWA, HYDRAULIC MODEL INVESTIGATION,
W71-10002 08B

MAGIC ISLAND COMPLEX, INCLUDING KEWALO BASIN AND ALA WAI BOAT HARBOR, HONOLULU, OAHU, HAWAII. HYDRAULIC MODEL INVESTIGATION,
W71-10003 08B

DROP STRUCTURE FOR GERING VALLEY PROJECT, SCOTTSBLUFF COUNTY, NEBRASKA HYDRAULIC MODEL INVESTIGATION,
W71-10004 08B

NAVIGATION CONDITIONS AT MCALPINE LOCKS AND DAM, OHIO RIVER. HYDRAULIC MODEL INVESTIGATION,
W71-10005 08B

NAVIGATION CONDITIONS AT COLUMBIA LOCK AND DAM, QUACHITA RIVER LOUISANA,
W71-10006 08B

SELECTION OF OPTIMUM ALIGNMENT LENGTH, AND HEIGHT OF BREAKWATERS, NEW BUFFALO HARBOR, MICHIGAN HYDRAUIIC MODEL INVESTIGATION,
W71-10008 08B

W71-10009 08B

DESIGNS FOR RUBBLE -MOUND BREAKWATERS, DANA POINT HARBOR, CALIFORNIA,
W71-10199 08B

ASIAN INST. OF TECH., BANGKOK (THAILAND) AND BANGKOK METROPOLITAN WATER WORKS AUTHORITY.
SURFACE DISTURBANCE FROM SUBMERGED JET,
W71-10171 08B

ATLANTIC RESEARCH CORP, COSTA MESA, CALIF. MISSILE SYSTEMS DIV.
CONCEPT DEVELOPMENT OF A HEAVY DUTY OIL CONTAINMENT SYSTEM FOR USE ON THE HIGH SEAS. VOLUME II. APPENDIX,
W71-10164 05G

ATOMIC ENERGY COMMISSION, WASHINGTON, D.C.
LICENSING OF PRODUCTION AND UTILIZATION FACILITIES (NUCLEAR POWER REACTORS).
W71-10286 06E

AUBURN UNIV., ALA. AGRICULTURAL EXPERIMENT STATION.
POULTRY DUST ORIGIN AND COMPOSITION,
W71-10110 05A

AUSTRALIAN NATIONAL UNIV., CANBERRA. DEPT. OF ZOOLOGY.
EFFECTS OF SUPERABUNDANT OXYGEN ON THERMAL TOLERANCE OF GOLDFISH,
W71-09985 05C

BATTELLE, MEMORIAL INST., COLUMBUS, OHIO. COLUMBUS LABS.
EVALUATING URBAN CORE USAGE OF WATERWAYS AND SHORELINES,
W71-09940 06B

BELL TELEPHONE LABS., MURRAY HILL, N.J.
'POLYWATER' AND SWEAT SIMILARITIES BETWEEN THE INFRARED SPECTRA,
W71-10322 01B

BINNIE AND PARTNERS (MALAYSIA).
THE SELETAR SCHEME, SINGAPORE,
W71-10382 03B

BOOZ-ALLEN APPLIED RESEARCH, INC. WASHINGTON, D.C.
A STATISTICAL DATA PLAN FOR BOMEX,
W71-10033 02B

BUREAU OF RECLAMATION, BISMARCK, N. DAK.
AUTOMATION FOR SMALL IRRIGATION PROJECTS,
W71-10391 03F

BUREAU OF RECLAMATION, DENVER, COLO. ENGINEERING AND RESEARCH CENTER.
LABORATORY EVALUATIONS OF CANAL SOIL SEALANTS. AN OPEN AND CLOSED CONDUIT SYSTEMS INVESTIGATION OF FOUR PROPRIETARY MATERIALS PROPOSED AS CANAL SOIL SEALANTS ON SILTY SAND IN LABORATORY PERMEAMETERS,
W71-10201 08D

REAERATION OF STREAMS AND RESERVOIRS ANALYSIS AND BIBLIOGRAPHY,
W71-10202 05G

BUREAU OF RECLAMATION, SACRAMENTO, CALIF.
BASIC EQUIPMENT IN AUTOMATIC DELIVERY SYSTEMS,
W71-10389 03F

BUREAU OF WATER HYGIENE, CINCINNATI, OHIO.
THE HEALTH EFFECTS OF NITRATES IN WATER (PANEL DISCUSSION),
W71-09957 05B

URBAN SOURCES OF NITRATES,
W71-09959 05B

TREATMENT OF WATER SUPPLIES FOR REMOVAL OF NITRATES,
W71-09961 05B

BURNS AND ROE, INC., ORADELL, N.J. AND DOW CHEMICAL CO., MIDLAND, MICH.
SEAWATER DESALTING WITH CHEMICAL RECOVERY.
W71-09975 03A

CALIFORNIA STATE DEPT. OF PUBLIC HEALTH, BERKELEY.
EXISTING LEVELS OF NITRATES IN WATER - THE CALIFORNIA SITUATION,
W71-09955 05B

CALIFORNIA UNIV., BERKELEY. DEPT OF GEOLOGY AND GEOPHYSICS AND NORTHWESTERN UNIV., EVANSTON, ILL. DEPT. OF GEOLOGICAL SCIENCES.
SILICATE-SEA WATER EQUILIBRIA IN THE OCEAN SYSTEM,
W71-09948 02K

CALIFORNIA UNIV., BERKELEY. DEPT OF SANITARY ENGINEERING.
NITRATES IN WATER SUPPLIES - THE PROBLEM,
W71-09953 05B

CALIFORNIA UNIV., BERKELEY. DEPT. OF CIVIL ENGINEERING.
VARIATIONAL PRINCIPLES FOR FLUID FLOW IN POROUS MEDIA,
W71-10318 02F

CALIFORNIA UNIV., BERKELEY. MICROBIOLOGY GROUP.
THE CHARACTERIZATION OF HYALOCHLORELLA MARINA GEN ET SP NOV A NEW COLOURLESS COUNTERPART OF CHLORELLA,
W71-10090 05C

CALIFORNIA UNIV., DAVIS. DEPT. OF WATER RESOURCES.
POWER LOSSES AND FLOW TOPOLOGIES IN CONVERGING MANIFOLD,
W71-10397 08B

CALIFORNIA UNIV., LOS ANGELES. DEPT. OF SYSTEMS ENGINEERING.
AN ANNOTATED BIBLIOGRAPHY ON THE DESIGN OF WATER RESOURCES SYSTEMS,
W71-09938 06A

CALIFORNIA UNIV., RIVERSIDE.
SUBSURFACE IRRIGATION TODAY AND TOMORROW IN CALIFORNIA,
W71-10387 03F

CANADA AGRICULTURAL RESEARCH STATION, SASKATOON (SASKATCHEWA) AND SASKATCHEWAN DEPT. OF NATURAL RESOURCES, SASKATOON.
RESIDUES OF DDT, DDE AND DDD IN FISH IN THE SASKATCHEWAN RIVER AFTER USING DDT AS A BLACKFLY LARVICIDE FOR TWENTY YEARS,
W71-10086 05C

CANTERBURY UNIV., CHRISTCHURCH (NEW ZEALAND). DEPT. OF CIVIL ENGINEERING AND LINCOLN COLL., CANTERBURY (NEW ZEALAND). DEPT. OF AGRICULTURAL ENGINEERING.
DRAG COEFFICIENTS IN NONSTEADY TURBULENT FLOW,
W71-10177 08B

COAST GUARD DISTRICT (7TH), MIAMI, FLA.
ATLANTA COASTAL REGION, MULTI AGENCY OIL AND HAZARDOUS MATERIALS, POLLUTION CONTINGENCY PLAN, REGION IV.
W71-10200 05G

COLORADO DEPT. OF HEALTH, DENVER.
WATER POLLUTION CONTROL IN COLORADO.
W71-10258 05G

COLORADO DEPT. OF HEALTH, DENVER. WATER POLLUTION CONTROL COMMISSION.
RULES AND GUIDELINES FOR WATER POLLUTION CONTROL AT LIVESTOCK CONFINEMENT AREAS AND GUIDELINES FOR CONSTRUCTION OF SEALED EVAPORATION AND RETENTION PONDS.
W71-10259 05G

COLORADO STATE UNIV., FORT COLLINS. DEPT. OF AGRICULTURAL ENGINEERING.
CATTLE FEEDLOT WATER QUALITY HYDROLOGY,
W71-10373 05G

CONNECTICUT UNIV., STORRS. DEPT. OF CIVIL ENGINEERING AND ROCKY MOUNTAIN HYDRAULIC LAB., ALLENSPORT, COLO.
PROTECTION OF OFF SHORE STRUCTURES AGAINST UNDERSCOUR,
W71-10175 08A

CORNELL UNIV., ITHACA, N.Y. DEPT. OF CIVIL AND AGRICULTURAL ENGINEERING.
CONTROL OF NITROGEN FROM ANIMAL WASTE WATERS,
W71-09960 05B

CORNELL UNIV., ITHACA, N.Y. WATER RESOURCES AND MARINE SCIENCES CENTER.
PLANNING ANALYSIS FOR THE NON-MARKET VALUES OF WATER RESOURCES WITH PARTICULAR EMPHASIS ON RECREATION,
W71-09944 06B

CORNELL UNIV., ITHACA, N.Y. DEPT. OF FOOD SCIENCE.
AIR POLLUTION FROM ANIMAL WASTES,
W71-10101 05A

CORPS OF ENGINEERS, LITTLE ROCK, ARK.
FLOOD PLAIN INFORMATION, JAMES RIVER AND TRIBUTARIES, SPRINGFIELD, MISSOURI, PART 2.
W71-09972 04A

CORPS OF ENGINEERS, LOS ANGELES, CALIF.
FLOOD PLAIN INFORMATION, SAN JACINTO RIVER (SAN JACINTO TO RAILROAD CANYON), RIVERSIDE COUNTY, CALIFORNIA.
W71-09973 04A

CORPS OF ENGINEERS, WASHINGTON, D.C.
ADMINISTRATIVE PROCEDURE (PERMITS FOR DISCHARGES OF DEPOSITS INTO NAVIGABLE WATERS).
W71-10135 06E

ENVIRONMENTAL STATEMENTS--PROPOSED GUIDELINES ON PREPARATION AND COORDINATION.
W71-10287 06E

DALHOUSIE UNIV., HALIFAX (NOVA SCOTIA). INST. OF OCEANOGRAPHY.
PARTICLE SIZE, WATER-STABLE AGGREGATES, AND BACTERIAL POPULATIONS IN LAKE SEDIMENTS,
W71-10069 05C

DANUBE HYDROMETEOROLOGICAL OBSERVATORY, IZMAIL (USSR).
THE LAWS OF ICE PROCESSES IN DELTAS,
W71-10042 02C

DELAWARE RIVER BASIN COMMISSION, TRENTON, N. J.
BASIN REGULATIONS--WATER QUALITY (WATER QUALITY STANDARDS, ABATEMENT, AND ENFORCEMENT PROCEDURES).
W71-10116 05G

DELAWARE RIVER BASIN COMMISSION, TRENTON, N.J.
ANNUAL REPORT 1970.
W71-10268 05G

ANNUAL REPORT 1968.
W71-10269 05G

DELAWARE WATER AND AIR RESOURCES COMMISSION, DOVER.
REGULATIONS GOVERNING THE USE OF WATER RESOURCES AND PUBLIC SUBAQUEOUS LANDS.
W71-10120 06E

INSTALLATION AND OPERATION OF SEPTIC TANK SEWAGE DISPOSAL SYSTEMS,
W71-10256 05D

WATER QUALITY STANDARDS.
W71-10257 05G

DEPARTMENT OF ENERGY, MINES AND RESOURCES, BURLINGTON (ONTARIO). INLAND WATERS BRANCH.
DETERMINATION OF TRACE AMOUNTS OF SCANDIUM BY ATOMIC ABSORPTION SPECTROSCOPY,
W71-10072 07B

DEPARTMENT OF ENERGY, MINES AND RESOURCES, BURLINGTON (ONTARIO). CANADA CENTRE FOR INLAND WATERS.
ATOMIC ABSORPTION DETERMINATION OF MICROGRAM QUANTITIES OF MOLYBDENUM IN LAKE WATERS,
W71-10077 07B

DEPARTMENT OF ENERGY, MINES AND RESOURCES, BURLINGTON (ONTARIO). CANADA CENTER FOR INLAND WATERS.
ORGANIC CARBON AND NITROGEN IN THE SURFACE SEDIMENTS OF LAKES ONTARIO, ERIE, AND HURON,
W71-10327 05A

DEPARTMENT OF ENERGY, MINES AND RESOURCES, OTTAWA (ONTARIO). INLAND WATERS BRANCH.
THE ICE REGIME OF THE MACKENZIE DELTA, NORTHWEST TERRITORIES,
W71-10048 02C

ELECTRICAL RESISTIVITY MEASUREMENTS IN FROZEN GROUND, MACKENZIE DELTA AREA, NORTHWEST TERRITORIES,
W71-10049 02C

A DYNAMIC PROGRAMMING ALGORITHM FOR THE OPERATION OF THE GREAT LAKES,
W71-10076 06B

DRESSER ATLAS, HOUSTON, TEX.
ACOUSTILOG-NUCLEAR LOGGING IN CASED WELLS,
W71-10428 03B

DU PONT DE NEMOURS (E.I.) AND CO., AIKEN, S.C. SAVANNAH RIVER LAB.
DETERMINATION OF DENSITY AND WATER CONTENT OF MARINE SEDIMENT IN AN UNEXTRUDED CORE USING FAST NEUTRON AND GAMMA RAY ATTENUATION,
W71-09950 02J

DUKE UNIV., DURHAM, N.C. MARINE LAB.
DEPOSITION OF DEEP-SEA SANDS COMPARISON OF TWO AREAS OF THE CAROLINA CONTINENTAL RISE,
W71-10328 02J

BIOCLASTIC TURBIDITE SEDIMENTATION IN COLUMBUS BASIN, BAHAMAS,
W71-10336 02J

ECOLE POLYTECHNIQUE, MONTREAL (QUEBEC).
TECHNIQUE FOR STUDY OF GRANULAR MATERIALS,
W71-10405 08D

EDINBURGH UNIV. (SCOTLAND). SCHOOL OF AGRICULTURE AND EDINBURGH UNIV. (SCOTLAND). DEPT. OF BACTERIOLOGY.
THE DECOMPOSITION OF URIC ACID IN BUILT UP POULTRY LITTER,
W71-10107 05B

EGYPTIAN DESERT INST., CAIRO.
REMARKS ON THE HYDROGEOLOGY OF THE NILE DELTA, UAR,
W71-10051 02F

THE STUDY OF MODELLING THE GROUNDWATER FLOW IN THE NILE DELTA USING THE ELECTRICAL ANALOG METHOD,
W71-10053 02F

ENTE NAZIONALE PER L'ENERGIA ELETTRICA, ROME (ITALY).
PROBLEMS WITH LARGE UNDERGROUND STATIONS IN ITALY,
W71-10402 08C

ENVIRONMENTAL PROTECTION AGENCY, WASHINGTON, D.C.
DISCHARGES OF OIL FOR RESEARCH, DEVELOPMENT AND DEMONSTRATION PURPOSES.
W71-10134 06E

STANDARDS OF PERFORMANCE FOR MARINE SANITATION DEVICES.
W71-10136 06E

CERTIFICATION OF POLLUTION CONTROL FACILITIES FOR TAX RELIEF.
W71-10283 06E

ENVIRONMENTAL PROTECTION AGENCY, WASHINGTON, D.C. AND ATOMIC ENERGY COMMISSION, WASHINGTON, D.C. AND NATIONAL MARINE FISHERIES SERVICES, WASHINGTON, D.C.
COLUMBIA RIVER THERMAL EFFECTS STUDY, VOLUME I BIOLOGICAL EFFECTS STUDIES.
W71-10213 05C

FARBENFABRIKEN BAYER A.G., ELBERFELD (WEST GERMANY).
FIELD AND LABORATORY TRIALS WITH BAYLUSCIDE IN THE BILHARZIASIS CONTROL PILOT PROJECT EGYPT 49,
W71-09994 05A

FARBENFABRIKEN BAYER A.G., ELBERFELD (WEST GERMANY). CHEMOTHERAPEUTIC INST.
DETERMINATION OF BAYLUSCIDE IN FIELD TESTS,
W71-09997 05A

FARBENFABRIKEN BAYER A.G., ELBERFELD (WEST GERMANY). INST. OF PARASITOLOGY AND VETERINARY MEDICINE.
LABORATORY METHODS FOR DETERMINING BAYLUSCIDE IN WATER SAMPLES,
W71-09996 05A

FARBENFABRIKEN BAYER A.G., ELBERFELD (WEST GERMANY). INST. OF PARASITOLOGY AND VETERINARY MEDICINE.
IMPORTANCE AND APPLICATION OF ANALYTICAL METHODS FOR MOLLUSCICIDES IN THE FIELD,
W71-09995 05A

FEDERAL MARITIME COMMISSION, WASHINGTON, D.C.
FINANCIAL RESPONSIBILITY FOR OIL POLLUTION CLEANUP.
W71-10133 06E

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, CHARLOTTESVILLE, VA. MIDDLE ATLANTIC REGION.
AGRICULTURE AS A SOURCE OF WATER POLLUTION,
W71-10375 05G

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, EVANSVILLE, IND. LOWER OHIO BASIN OFFICE.
EFFECT OF AGRICULTURE ON WATER QUALITY,
W71-10376 05G

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, KANSAS CITY, MO. MISSOURI BASIN REGION.
2ND COMPENDIUM OF ANIMAL WASTE MANAGEMENT.
W71-10366 05G

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, KANSAS CITY, MO.
ANIMAL WASTE RUNOFF - A MAJOR WATER QUALITY CHALLENGE,
W71-10367 05G

MAJOR PROBLEMS OF WATER POLLUTION CREATED BY AGRICULTURAL PRACTICES,
W71-10374 05G

FERRARA UNIV. (ITALY). ISTITUTO DI IGIENE.
WATER POLLUTION AND SELF-PURIFICATION STUDY ON THE PO RIVER BELOW FERRARA,
W71-10324 05B

FISHERIES RESEARCH BOARD OF CANADA, ST. ANDREWS (NEW BRUNSWICK). BIOLOGICAL STATION.
MEASUREMENT OF POLLUTANT TOXICITY TO FISH. II. UTILIZING AND APPLYING BIOASSAY RESULTS,
W71-09989 05C

FLORIDA STATE UNIV., TALLAHASSEE. DEPT. OF OCEANOGRAPHY.
MERCURY COMPOUNDS REDUCE PHOTOSYNTHESIS BY PLANKTON,
W71-09980 05C

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, ROME (ITALY).
AN ANNOTATED LIST OF FAO PUBLICATIONS ON INLAND WATER POLLUTION, AND WATER QUALITY AND QUANTITY WITH SPECIAL REFERENCE TO FISH LIFE 1957-1970,
W71-09981 05C

FUJIKURA CABLE WORKS LTD., TOKYO (JAPAN).
AGING OF OIL-FILLED CABLE DIELECTRICS,
W71-10404 08C

GEOLOGICAL SURVEY, BATON ROUGE, LA.
SELECTED HYDROLOGIC CHARACTERISTICS OF THE SABINE RIVER AND BAYOU ANACOCO, LOUISIANA AND TEXAS,
W71-09946 05B

GEOLOGICAL SURVEY, FORT COLLINS, COLO. WATER RESOURCES DIV.
FLOOD FLOW DOWNSTREAM FROM SLIDE,
W71-10316 02J

GEOLOGICAL SURVEY, SALT LAKE CITY, UTAH., AND GEOLOGICAL SURVEY, MENLO PARK, CALIF.
GROUNDWATER IN DELTAS OF THE BONNEVILLE BASIN THE GREAT BASIN, U.S.A.,
W71-10052 02F

GEORGIA INST. OF TECH., ATLANTA. DEPT. OF CIVIL ENGINEERING.
SEEPAGE FORCE ON INTERFACIAL BED PARTICLES,
W71-09943 02J

FINITE-DIFFERENCE SIMULATION OF BORE PROPAGATION,
W71-10174 08B

GEORGIA INST. OF TECH., ATLANTA. DEPT. OF CIVIL ENGINEERING AND STANFORD UNIV., CALIF.
HYDROLOGIC CONSEQUENCES OF RAINFALL AUGMENTATION,
W71-10179 03B

GEORGIA WATER QUALITY CONTROL BOARD, ATLANTA.
WATER USE CLASSIFICATIONS AND WATER QUALITY STANDARDS.
W71-10312 06E

GEORGIA, UNIV., ATHENS. DEPT. OF AGRONOMY.
THE METAL COMPLEXING CAPACITY AND THE NATURE OF THE CHELATING LIGANDS OF WATER EXTRACT OF POULTRY LITTER,
W71-10102 05A

GIDROMETEOROLOGICHESKII NAUCHNO-ISSLEDOVATELSKII TSENTR, LENINGRAD (USSR).
IDENTIFICATION OF NONLINEAR HYDROLOGICAL SYSTEMS (IDENTIFIKATSIYA NELINEYNYKH GIDROLOGICHESKIKH SISTEM),
W71-10342 02E

GULF COAST WATER HYGIENE LAB., DAUPHIN ISLAND, ALA.
DIGESTION OF OYSTERS FOR THE DETERMINATION OF MERCURY,
W71-10092 05A

HARBOLD'S HATCHERY, INC., WINTERVILLE, GA.
DISPOSAL OF HATCHERY WASTES,
W71-10364 05D

HAWAII DEPT. OF HEALTH, HONOLULU.
WATER POLLUTION CONTROL.
W71-10298 06E

WATER QUALITY STANDARDS.
W71-10299 06E

HAWAII UNIV., HONOLULU. WATER RESOURCES RESEARCH CENTER.
GROUND WATER RESOURCES AND DEVELOPMENT COASTAL PLAIN REGION ERH JEN CHI--KAOHSIUNG, TAIWAN,
W71-10163 02F

HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1, LUBBOCK, TEX.
OBSERVATION WELL RECORDS...THE ANNUAL WATER STATEMENT, 1969-1970.
W71-10413 04B

AQUIFER MODEL RESEARCH REVIEWED.
W71-10416 02F

AVERAGE WATER TABLE DECLINE.
W71-10417 04B

HITACHI CABLE LTD., TOKYO (JAPAN).
ESTIMATE OF FORCES EXERTED AGAINST SPACERS WHEN FAULTY CONDITION OCCURS,
W71-10409 08C

HOPKINS MARINE STATION, PACIFIC GROVE, CALIF.
DDT RESIDUES IN MARINE PHYTOPLANKTON INCREASE FROM 1955 TO 1969,
W71-09984 05A

HOUSTON UNIV., TEX. DEPT. OF CIVIL ENGINEERING AND NORTHWESTERN UNIV., EVANSTON, ILL. DEPT. OF CIVIL ENGINEERING.
GENERATED MONTHLY STREAMFLOWS FOR THE MIDWESTERN AND SOUTHWESTERN UNITED STATES,
W71-10321 02E

HULL UNIV. (ENGLAND). DEPT. OF GEOGRAPHY.
MEASURING EVAPOTRANSPIRATION A REVIEW,
W71-10013 02D

HURON RIVER WATERSHED COUNCIL, ANN ARBOR, MICH. INLAND LAKES AND SHORELAND PROJECT.
INLAND LAKES AND SHORELANDS MANAGEMENT IN THE GREAT LAKES STATES AND NEW ENGLAND,
W71-09945 04A

HYDROLOGICAL RESEARCH UNIT. WALLINGFORD (ENGLAND).
THE USE OF THE TERM 'LINEARITY' AS APPLIED TO HYDROLOGICAL MODELS,
W71-10020 02A

HYDRO-ELECTRIC COMMISSION, TASMANIA.
A THEORY FOR THE SHEAR STRENGTH OF ROCKFILL,
W71-10403 08D

ILLINOIS STATE WATER SURVEY, URBANA AND ILLINOIS UNIV., URBANA. WATER RESOURCES CENTER AND IOWA UNIV., IOWA CITY. DEPT. OF MECHANICS AND HYDRAULICS.
LONGITUDINAL DISPERSION OF BED-MATERIAL PARTICLES,
W71-10169 02J

ILLINOIS STATE WATER SURVEY, URBANA.

NOTE ON THE MAP SCALE EFFECT IN THE STUDY OF STREAM MORPHOLOGY,
W71-10010 07C

ATMOSPHERIC CONTROLS OF WATER EXCHANGE IN GREAT LAKES BASIN,
W71-10026 03B

ILLINOIS STATE WATER SURVEY, URBANA. CHEMISTRY SECTION.
EXISTING LEVELS OF NITRATES IN WATERS - THE ILLINOIS SITUATION,
W71-09956 05A

ILLINOIS UNIV., CHICAGO.
BIOGENIC REWORKING OF FLUVIAL SEDIMENTS BY STAPHYLINID BEETLES,
W71-10331 02J

ILLINOIS UNIV., URBANA. DAIRY SCIENCE.
ANIMAL WASTE DISPOSAL BECOMES A MORE DIFFICULT PROBLEM,
W71-10362 05D

ILLINOIS UNIV., URBANA. DEPT. OF SANITARY ENGINEERING.
NITRATE AND WATER SUPPLY SOURCE AND CONTROL.
W71-09952 05B

IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND). DEPT. OF CIVIL ENGINEERING.
THE BEHAVIOR OF A SOFT RECENT SEDIMENT UNDER EMBANKMENT LOADINGS,
W71-10032 08D

INDIAN AGRICULTURAL RESEARCH INST., NEW DELHI. DIV. OF MICROBIOLOGY.
SOLUBILIZATION OF TRICALCIUM PHOSPHATE BY BLUE-GREEN ALGAE,
W71-10070 05C

INDIANA STREAM POLLUTION CONTROL BOARD, INDIANAPOLIS.
WATER QUALITY STANDARDS FOR WATERS OF INDIANA.
W71-10119 05G

INDIANA UNIV., BLOOMINGTON. DEPT. OF GEOGRAPHY.
ANNUAL, SEASONAL, AND MONTHLY CHANGES IN RUNOFF IN THE UNITED STATES,
W71-10029 02E

INDIANA UNIV., BLOOMINGTON. DEPT. OF MICROBIOLOGY.
BIMODAL DISTRIBUTION OF PH VALUES OF THERMAL SPRINGS OF THE WORLD.
W71-10339 02K

INDUSTRIAL POLLUTION CONTROL, INC., WESTPORT. CONN.
MERCURY POLLUTION INTEREST IN IT NOW ON THE UPSWING,
W71-10088 05C

INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE, THONON-LES-BAINS (FRANCE). STATION D'HYDROBIOLOGIE CONTINENTALE.
DEVELOPMENT OF PHYSICO-CHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS PRECEDING SUMMER STAGNATION IN A RESERVOIR (IN FRENCH),
W71-10087 05C

INSTITUTE OF ECOLOGY, WARSAW (POLAND).
A REVIEW OF STUDIES ON THE BOTTOM SEDIMENTS OF LAKES (IN POLISH),
W71-10095 05C

INSTITUTE OF HYDROTECHNICAL RESEARCH, BUCHAREST (RUMANIA).
DATA ON THE CHARACTERISTICS OF RIVER CURRENTS ON THE SURFACE AT THE MOUTH OF THE SULINA CHANNEL(FRENCH DONNEES SUR LES CHARACTERISTIQUES DES COURANTS FLUVIAUX DE SURFACE A L'EMBOUCHURE DU CANAL DE SULINA),
W71-10041 02E

HYDRAULIC CHARACTERISTICS OF THE HYDROMETRIC SECTION AT THE MOUTH OF THE SULINA ARM (FRENCH CARACTERISTIQUES HYDRAULIQUES DE LA SECTION HYDROMETRIQUE A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10043 02J

CALCULATION OF COARSE ALLUVIUM DISCHARGE (SANDS) FROM THE SULINA ARM (FRENCH CALCUL DE L'ECOULEMENT DES ALLUVIONS GROSSIERES (SABLES) A L'EMBOUCHURE DU BRAS DE SULINA),
W71-10044 02J

A STUDY ON THE STRUCTURES INFLUENCING THE FLOW AT THE SULINA RIVER MOUTH,
W71-10056 08B

THE INFLUENCE OF MANAGEMENT WORKS ON THE MORPHOLOGY OF THE ARMS OF THE DANUBE DELTA (FRENCH L'INFLUENCE DES TRAVAUX D'AMENAGEMENT SUR LA MORPHOLOGIE DES BRAS DU DELTA DU DANUBE),
W71-10059 08B

INSTITUTUL DE MEDICINA SE FARMACIA, IASI (RUMANIA). CATEDRA DE IGIENA.
CONSIDERATIONS ON THE INTERACTION BETWEEN SURFACE WATER AND GROUNDWATER OF THE DANUBE DELTA (FRENCH CONSIDERATIONS SUR L'INTERACTION ENTRE LES EAUX DE SURFACE ET SOUTERRAINES DU TERRITOIRE DU DELTA DU DANUBE),
W71-10054 05B

INSTYTUT RYBACTWA SRODIGDOWEGO, OLSZTYN-KORTOWO (POLAND). ZAKLAD HYDROBIOLOGII.
PHYTOPLANKTON COEFFICIENTS AS A METHOD OF DEFINING THE DEGREE TO WHICH WATER HABITATS ARE TROPHIC (IN POLISH),
W71-10075 05C

IOWA STATE UNIV., AMES. DEPT. OF EARTH SCIENCES.
ADSORPTION AND THE RELIABILITY OF TRACE ELEMENTS AS ENVIRONMENT INDICATORS FOR SHALES,
W71-10333 02G

IOWA STATE UNIV., AMES. DEPT. OF AGRONOMY., AND IOWA STATE UNIV AMES. DEPT. OF PHYSICS.
AUGER HOLE SEEPAGE THEORY,
W71-10011 02G

IOWA UNIV., IOWA CITY. DEPT. OF CIVIL ENGINEERING.
ANIMAL WASTES--A MAJOR POLLUTION PROBLEM,
W71-10368 05G

JACOBS ASSOCIATES, SAN FRANCISCO, CALIF.
BETTER SPECIFICATIONS FOR UNDERGROUND WORK,
W71-10401 06B

JADAVPUR UNIV., CALCUTTA. (INDIA). DEPT. OF ELECTRICAL ENGINEERING AND CALCUTTA PORT COMMISSIONERS (INDIA). HYDRAULIC STUDY DEPT.
ON STUDIES OF REFLECTIONS IN TIDAL RIVERS AND THEIR BRANCHES,
W71-10040 02E

KANSAS AGRICULTURAL EXPERIMENT STATION, MANHATTAN.
INSECTICIDE USAGE AND RESIDUES IN A NEWLY DEVELOPED GREAT PLAINS IRRIGATION DISTRICT,
W71-09941 05B

KANSAS STATE DEPT. OF HEALTH, TOPEKA. ENVIRONMENTAL HEALTH SERVICES.
REGULATORY ASPECTS OF FEEDLOT WASTE MANAGEMENT,
W71-10369 05G

KANSAS STATE UNIV., MANHATTAN. DEPT. OF AGRICULTURAL ENGINEERING.
DESIGN FOR FEEDLOT WASTE MANAGEMENT - HISTORY AND CHARACTERISTICS,
W71-10371 05G

KENTUCKY WATER POLLUTION CONTROL COMMISSION, FRANKFORT.
WATER QUALITY STANDARDS FOR INTERSTATE WATERS,
W71-10160 05G

POLLUTION FROM BOATS AND VESSELS,
W71-10161 05G

BY-PASSING OF SEWAGE, INDUSTRIAL, AND OTHER WASTE TREATMENT PLANTS AND EMERGENCY, ACCIDENTAL, OR OTHER EXCESSIVE SPILLS AND DISCHARGES OF SEWAGE, INDUSTRIAL OR OTHER WASTES.
W71-10167 05G

PERMITS TO DISCHARGE SEWAGE, INDUSTRIAL WASTES OR OTHER WASTES.
W71-10273 06E

KHARTOUM UNIV., (SUDAN). DEPT. OF GEOLOGY.
VARIATION OF SPECIFIC RETENTION IN RUBBLY ROCK PARTICLES,
W71-10019 02F

KONINKLIJKE/SHELL-LABORATORIUM, AMSTERDAM (NETHERLANDS).
TRANSPORT OF MINERAL OIL COMPONENTS TO GROUNDWATER--1. MODEL EXPERIMENTS ON THE TRANSFER OF HYDROCARBONS FROM A RESIDUAL OIL ZONE TO TRICKLING WATER,
W71-10325 05B

LAMAR STATE COLL. OF TECH., BEAUMONT, TEX. DEPT. OF BIOLOGICAL SCIENCES.
FIRE ANTS, HEPTACHLOR, AND FISH KILL,
W71-09993 05C

LEGGETTE, BRASHEARS AND GRAHAM, NEW YORK.
NEW TOOLS FOR NEW AND OLD WELLS,
W71-10422 08A

LEHIGH UNIV., BETHLEHEM, PA.
LIMIT ANALYSIS OF STABILITY OF SLOPES,
W71-10393 08D

MAHARASHTRA ASSOCIATION FOR THE CULTIVATION OF SCIENCE, POONA (INDIA) AND J.N. AGRICULTURAL UNIV., JABALPUR, INDIA, INSTRUMENT DEVELOPMENT AND SERVICE CENTER.
AN ELECTROMETRIC METHOD FOR THE DETERMINATION OF SCIL MOISTURE,
W71-10012 02G

MARYLAND DEPT. OF WATER RESOURCES, ANNAPOLIS AND MARYLAND DEPT. OF HEALTH AND MENTAL HYGIENE, ANNAPOLIS.
STATUS OF WATER QUALITY AND SIGNIFICANT SOURCES OF WASTE WATER DISCHARGES IN MARYLAND.
W71-10254 05G

MARYLAND DEPT. OF WATER RESOURCES, ANNAPOLIS.
REGULATIONS ON POLLUTION ABATEMENT.
W71-10304 06E

MARYLAND UNIV., COLLEGE PARK. DEPT. OF CIVIL ENGINEERING.
PARAMETER ESTIMATION FOR AQUIFER EVALUATION,
W71-10024 02F

MARYLAND UNIV., PRINCE FREDERICK. NATURAL RESOURCES INST.
SPECIES DIVERSITY SPECIES ABUNDANCE OF FISH POPULATIONS AN EXAMINATION OF VARIOUS METHODS,
W71-10210 07C

MASSACHUSETTS DIV. OF WATER POLLUTION CONTROI, BOSTON.
RULES FOR THE PREVENTION AND CONTROL OF OIL POLLUTION IN THE WATERS OF THE COMMONWEALTH.
W71-10115 05G

MASSACHUSETTS UNIV., AMHERST. DEPT. OF FORESTRY AND WILDLIFE MANAGEMENT.
CHLORINATED HYDROCARBON PESTICIDE RESIDUES IN WINTER

FLOUNDER, PSEUDO-PLEURONECTES AMERICANUS, FROM THE NEWFANTIC RIVER ESTUARY, MASSACHUSETTS,
W71-10212 05C

MEMORIAL UNIV. OF NEWFOUNDLAND, ST JOHN'S. DEPT. OF BIOLOGY AND LAVAL UNIV. QUEBEC. DEPARTEMENT DE BIOLOGIE.
A CHECKLIST OF MARINE ALGAE OF EASTERN CANADA,
W71-10066 05C

METCALF AND EDDY, INC., BOSTON, MASS.
THE NITROGEN CYCLE.
W71-09954 05B

METEOROLOGICAL OFFICE, POONA (INDIA).
A STUDY OF DISTRICTWISE DISTRIBUTION OF RAINFALL IN BIHAR,
W71-10015 02B

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, LOS ANGELES.
CAVITATION PARAMETERS FOR OUTLET VALVES,
W71-10379 08B

MIAMI UNIV., FLA. SCHOOL OF MARINE AND ATMOSPHERIC SCIENCES, AND LIVERPOOL UNIV. (ENGLAND). DEPT. OF OCEANOGRAPHY.
THE DISTRIBUTION OF THE MAJOR AND SOME MINOR ELEMENTS IN MARINE ANIMALS, PART II. MOLLUSCS,
W71-09982 05A

MICHIGAN STATE UNIV., EAST LANSING, W.K. KELLOGG BIOLOGICAL STATION.
INTERRELATIONS OF SEVERAL ABIOTIC FACTORS AND THE HIGHER AQUATIC PLANTS IN A STREAM ECOSYSTEM,
W71-10036 05C

MICHIGAN STATE UNIV., EAST LANSING. DEPT. OF POULTRY SCIENCE.
RECYCLED POULTRY NUTRIENTS,
W71-10365 05D

MICHIGAN STATE UNIV., HICKORY CORNERS. W. K. KELLOGG BIOLOGICAL STATION.
DISSOLVED ORGANIC MATTER AND PHYTOPLANKTONIC PRODUCTIVITY IN MARL LAKES,
W71-10079 05C

RECENT AND POSTGLACIAL PRODUCTION RATES OF A MARL LAKE,
W71-10080 05C

MICHIGAN STATE UNIV., HICKORY CORNERS. W.K. KELLOGG BIOLOGICAL STATION.
A SIMPLE, SENSITIVE UNDERWATER PHOTOMETER,
W71-10089 07B

DISSOLVED ORGANIC COMPOUNDS AND THEIR UTILIZATION IN TWO MARL LAKES,
W71-10091 05C

MICHIGAN UNIV., ANN ARBOR.
TRANSIENTS IN PIPELINES CARRYING LIQUIDS OR GASES,
W71-10395 08B

MICHIGAN UNIV., ANN ARBOR. DEPT. OF SANITARY ENGINEERING.
SECONDARY EFFECTS OF NITROGEN IN WATER,
W71-09958 05B

MINNESOTA DEPT. OF HEALTH, GLENWOOD ILLINOIS UNIV., URBANA. DEPT. OF AGRICULTURAL ENGINEERING.
LABORATORY STUDIES OF AEROBIC STABILIZATION OF SWINE WASTE,
W71-10106 05D

MINNESOTA UNIV., ST. PAUL. DEPT. OF ENTOMOLOGY, FISHERIES AND WILDLIFE.
EFFECTS OF MANURE APPLICATIONS AND MITE PREDATION ON CORN ROOTWORM POPULATIONS IN MINNESOTA,
W71-10359 05C

MISSISSIPPI AIR AND WATER POLLUTION CONTROL COMMISION, JACKSON.
WATER QUALITY CRITERIA FOR INTRASTATE WATERS.
W71-10267 06E

MISSISSIPPI STATE UNIV., STATE COLLEGE. DEPT. OF ZOOLOGY.
LEVELS OF INSECTICIDE RESISTANCE IN FRESH-WATER SHRIMP, PALAEMONETES KADIAKENSIS,
W71-10084 05C

MISSOURI UNIV., COLUMBIA.
STOCKMEN'S LIABILITY UNDER THE MISSOURI NUISANCE LAW,
W71-10103 05C

MISSOURI UNIV., COLUMBIA. DEPT. OF CIVIL ENGINEERING AND UNIVERSIDAD NACINAL DE COLUMBIA, BOGOTA. DEPT. OF CIVIL ENGINEERING.
WIND-INDUCED CIRCULATION IN SHALLOW WATER,
W71-10170 02E

MISSOURI UNIV., COLUMBIA. DEPT. OF ZOOLOGY.
COMMUNITY METABOLISM IN ACID AND ALKALINE STRIP-MINE LAKES,
W71-09990 05C

MISSOURI UNIV., COLUMBIA. WATER RESOURCES RESEARCH CENTER.
POLLUTION - HOW MUCH OF A PROBLEM COMES FROM FERTILIZERS,
W71-10099 05C

MANAGEMENT OF ANIMAL FEEDLOT WASTES -- LAND SPREADING AS A DISPOSAL PROCESS,
W71-10370 05G

CONTRIBUTION OF FERTILIZERS TO WATER POLLUTION,
W71-10372 05G

MISSOURI UNIV., ROLLA. DEPT. OF CIVIL ENGINEERING.
OPEN-CHANNEL PROFILES BY NEWTON'S ITERATION TECHNIQUE,
W71-10018 02E

MISSOURI WATER POLLUTION BOARD, JEFFERSON CITY, MO.
REGULATIONS FOR PREVENTION OF POLLUTION OF SUBSURFACE WATERS OF THE STATE,
W71-10157 05G

REGULATIONS FOR TURBID WATER DISCHARGES AND TO PREVENT INTERMITTENT OR ACCIDENTAL POLLUTION OF WATERS OF THE STATE,
W71-10159 05G

MISSOURI WATER POLLUTION BOARD, JEFFERSON CITY.
MISSOURI RIVER BASIN WATER QUALITY STANDARDS.
W71-10113 05G

MARINE TOILET REGULATIONS,
W71-10158 05G

MISSOURI WATER RESOURCES BOARD, JEFFERSON CITY.
MISSOURI WATER PLAN, STATE LAWS, POLICIES AND PROGRAMS PERTAINING TO WATER AND RELATED LAND RESOURCES.
W71-10270 06E

MONASH UNIV., CLAYTON (AUSTRALIA).
FIELD SOLUTIONS FOR TURBULENT SEEPAGE FLOW,
W71-10394 08D

MOSCOW STATE UNIV. (USSR). DEPT. OF ARID LAND HYDROLOGY.
VARIATIONS IN THE ANNUAL DISTRIBUTION OF RUNOFF FOR RIVERS IN EASTERN TRANSCAUCASIA (IZMENCHIVOST' VNUTRIGODCVOGO RASPREDELENIYA STOKA REK VOSTOCHNOGO ZAKAVKAZ'YA),
W71-10354 02E

MOSCOW STATE UNIV. (USSR). RESEARCH LAB. FOR SNOW SLIDES.
MUD FLOW OCCURRENCES IN THE RSFSR (RASPPOSTRANENIYE SELEY NA TERRITORII RSFSR),
W71-10351 02J

NATIONAL AERONAUTIC AND SPACE ADMINISTRATION, HAMPTON, VA. LANGLEY RESEARCH CENTER AND PURDUE UNIV., LAFAYETTE, IND. SCHOOL OF AERONAUTIC, ASTRONAUTIC AND ENGINEERING SCIENCES.
STOCHASTIC MODEL OF TURBULENT CHANNEL FLOW,
W71-10317 08B

NATIONAL COUNCIL OF THE PAPER INDUSTRY FOR AIR AND STREAM IMPROVEMENT, INC., NEW YORK.
AN INTRODUCTION TO DETERMINATION OF ESTUARINE ASSIMILATIVE CAPACITY,
W71-10093 05B

NATIONAL INSTITUTES OF HEALTH, BETHESDA, MD. DIV OF RESEARCH SERVICES.
CAGE AND KENNEL WASTE WATER,
W71-10100 05A

NATIONAL MARINE FISHERIES SERVICE, WASHINGTON, D.C.
COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT.
W71-10284 06E

NATIONAL MARINE WATER QUALITY LAB., WEST KINGSTON, R.I.
PESTICIDES IN THE MARINE ENVIRONMENT,
W71-09992 05C

NATURAL ENVIRONMENT RESEARCH COUNCIL, ABERDEEN (SCOTLAND). FISHERIES BIOCHEMICAL RESEARCH UNIT.
AVOIDANCE REACTIONS OF MARINE INVERTEBRATES TO EITHER STEROID GLYCOSIDES OF STARFISH OR SYNTHETIC SURFACE-ACTIVE AGENTS,
W71-10211 05C

NEVADA UNIV. SYSTEM, RENO, DESERT RESEARCH INST., CENTER FOR WATER RESOURCES RESEARCH.
CROSS SPECTRAL ANALYSIS OF PRECIPITATION AND STREAMFLOW DATA SYSTEMS,
W71-10037 07C

NEVADA UNIV., RENO. NEVADA AGRICULTURAL EXPERIMENT STATION.
PAHRUMP FIELD LABORATORY,
W71-10414 03F

NEW HAMPSHIRE UNIV., DURHAM. INST. OF NATURAL AND ENVIRONMENTAL RESOURCES.
DISSOLVED SOLIDS - DISCHARGE RELATIONSHIPS, 2. APPLICATIONS TO FIELD DATA,
W71-09942 05B

NORGES TEKNISKE HOEGSKOLE, TRONDHEIM.
LONG-TIME DURABILITY OF CONCRETE IN SEAWATER,
W71-10380 08F

NORGES TEKNISKE HOEGSKOLE, TRONDHEIM. INSTITUTT FOR ANLEGGSDRIFT OG HAVNEBYGGING.
ANALYSIS OF SEDIMENTATION DATA,
W71-10315 02J

NORTH CAROLINA UNIV., CHAPEL HILL. DEPT. OF CITY AND REGIONAL PLANNING AND NORTH CAROLINA UNIV., CHAPEL HILL. DEPT. OF ENVIRONMENTAL SCIENCES AND ENGINEERING.
WATER RESOURCE PLANNING IN THE URBAN-METROPOLITAN CONTEXT,
W71-09932 06B

NORTH CAROLINA UNIV., CHAPEL HILL. DEPT. OF ENVIRONMENTAL SCIENCES AND ENGINEERING.
DISSOLVED ORGANIC PHOSPHORUS EXCRETION BY MARINE PHYTOPLANKTON,
W71-10083 05C

NORTH DAKOTA UNIV., GRAND FORKS. DEPT. OF BIOLOGY AND

NORTH DAKOTA UNIV., GRAND FORKS. DEPT. OF GEOLOGY.
PRIMARY PRODUCTIVITY MEASUREMENTS AT DEVILS LAKE, NORTH DAKOTA,
W71-10062 05C

NORTH DAKOTA UNIV., GRAND FORKS. DEPT. OF BIOLOGY.
ZOOPLANKTON-PHYTOPLANKTON RELATIONSHIPS IN DEVILS LAKE, NORTH DAKOTA,
W71-10063 05C

NORTH DAKOTA UNIV., GRAND FORKS. DEPT. OF GEOLOGY.
WIND-ORIENTED GASTROPOD SHELLS AS INDICATORS OF PALEOWIND DIRECTION,
W71-10330 02J

NORTH STAR RESEARCH AND DEVELOPMENT INST., MINNEAPOLIS, MINN.
DEVELOPMENT OF ULTRATHIN REVERSE OSMOSIS MEMBRANES FOR DESALINATION,
W71-09977 03A

NORTHEASTERN UNIV., BOSTON, MASS. DEPT. OF CIVIL ENGINEERING.
TIME VARYING MATHEMATICAL MODEL FOR WATER QUALITY,
W71-10326 05B

NORTHWESTERN UNIV., BOSTON, MASS. DEPT. OF BIOLOGY.
PRIMARY PRODUCTION DEPRESSION OF OXYGEN EVOLUTION IN ALGAL CULTURES BY ORGANOPHOSPHORUS INSECTICIDES,
W71-10096 05C

NOTTINGHAM UNIV. (ENGLAND). SCHOOL OF AGRICULTURE.
THE INFLUENCE OF GRADED LEVELS OF ATMOSPHERIC AMMONIA ON CHICKENS,
W71-10105 05C

OAK RIDGE NATIONAL LAB., TENN. NUCLEAR DESALINATION PROGRAM.
VTR PILOT PLANT ANNUAL REPORT FOR THE PERIOD ENDING JULY 1, 1968,
W71-09976 03A

OFFICE OF WATER RESOURCES RESEARCH, WASHINGTON, D.C. WATER RESOURCES SCIENTIFIC INFORMATION CENTER.
TRACE ELEMENTS IN WATER - A BIBLIOGRAPHY.
W71-10190 05B

MERCURY IN WATER - A BIBLIOGRAPHY.
W71-10191 05B

STRONTIUM IN WATER - A BIBLIOGRAPHY.
W71-10192 05B

COPPER IN WATER - A BIBLIOGRAPHY.
W71-10193 05B

MANGANESE IN WATER - A BIBLIOGRAPHY.
W71-10194 05B

MAGNESIUM IN WATER - A BIBLIOGRAPHY.
W71-10195 05B

ZINC IN WATER - A BIBLIOGRAPHY.
W71-10196 05B

OHIO STATE UNIV., COLUMBUS. DEPT. OF GEOLOGY.
PUGET PEAK AVALANCHE, ALASKA.
W71-10335 02J

OHIO STATE UNIV., COLUMBUS. DEPT. OF MICROBIAL AND CELLULAR BIOLOGY.
ADSORPTION OF CHLORINATED HYDROCARBON PESTICIDES BY MICROBIAL FLOC AND LAKE SEDIMENT AND ITS ECOLOGICAL IMPLICATIONS,
W71-10065 05C

OKLAHOMA STATE UNIV., STILLWATER, DEPT. OF ECONOMICS.
LAND TENURE AND VALUE RESPONSE TO WATERWAY IMPROVEMENT THEORY AND PRELIMINARY RESEARCH DESIGN,
W71-09937 06B

OREGON DEPT. OF ENVIRONMENTAL QUALITY, SALEM.
PLANT OPERATION (WASTE TREATMENT DISPOSAL REQUIREMENTS).
W71-10300 06E

STATE FINANCIAL ASSISTANCE TO PUBLIC AGENCIES FOR POLLUTION CONTROL FACILITIES.
W71-10301 06E

PATCHICK(PAUL F.), PEBBLE BEACH, CALIF.
ESTIMATING WATER WELL SPECIFIC CAPACITY UTILIZING PERMEABILITY OF DISTURBED SAMPLES,
W71-10421 08A

PENINSULAR CHEMRESEARCH, INC., GAINESVILLE, FLA.
SYNTHESIS AND EVALUATION OF NEW MEMBRANE CANDIDATES FOR APPLICATION IN REVERSE OSMOSIS,
W71-09978 03A

PENNSYLVANIA DEPT OF HEALTH, HARRISBURG.
REGULATIONS FOR PUBLIC WATER SUPPLIES.
W71-10279 06E

PENNSYLVANIA DEPT. OF ENVIRONMENTAL RESOURCES, HARRISBURG.
A RUNOFF POTENTIAL RATING TABLE FOR SOILS,
W71-10016 02G

PENNSYLVANIA DEPT. OF FORESTS AND WATERS, HARRISBURG. WATER RESOURCES BRANCH.
REAPPRAISAL OF WATER SUPPLY RESOURCES IN DELAWARE RIVER BASIN USING SYNTHETIC HYDROLOGY,
W71-10320 04A

PENNSYLVANIA SANITARY WATER BOARD, HARRISBURG.
TREATMENT REQUIREMENTS.
W71-10276 06E

MINE DRAINAGE.
W71-10277 06E

SPECIAL REGULATIONS.
W71-10278 06E

PENNSYLVANIA STATE UNIV., COLLEGE PARK. AGRICULTURAL EXPERIMENT STATION.
THE INFLUENCE OF ASHED POULTRY MANURE ON SOIL, SNAP BEANS, AND TOMATOES,
W71-10355 05D

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
VALUE OF PROCESSED POULTRY WASTE AS A FEED FOR RUMINANTS,
W71-10358 05D

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK. DEPT. OF CIVIL ENGINEERING.
PARAMETER ESTIMATION IN HYDROLOGY THE STATE OF THE ART,
W71-10025 02F

PITTSBURG UNIV., PA. PYMATUNING LAB. OF ECOLOGY AND MICHIGAN STATE UNIV., HICKORY CORNERS. W. K. KELLOGG BIOLOGICAL STATION.
ENERGY FLOW IN A WOODLAND STREAM ECOSYSTEM I. TISSUE SUPPORT TROPHIC STRUCTURE OF THE AUTUMNAL COMMUNITY, (WITH GERMAN SUMMARY),
W71-10064 05C

PRINCETON UNIV., N.J. DEPT. OF CIVIL AND GEOLOGICAL ENGINEERING.
HYDROLOGY OF THE PAMLICO ESTUARY IN THE STATE OF NORTH CAROLINA,
W71-10050 02L

PUBLIC HEALTH SERVICE, WASHINGTON, D.C. CONSUMER PROTECTION AND ENVIRONMENTAL HEALTH SERVICE.
TRACE METAL ACCUMULATION BY THE AMERICAN EASTERN OYSTER, CRASSOSTREA VIRGINICA,
W71-10209 05C

PURDUE UNIV., LAFAYETTE, IND AND BAGHDAD UNIV. (IRAQ).
CAPACITANCE TECHNIQUES FOR RADIAL DEFORMATIONS,
W71-10407 08D

RHODE ISLAND UNIV., KINGSTON. DEPT. OF CIVIL AND ENVIRONMENTAL ENGINEERING.
METAL TOXICITY TO SEWAGE ORGANISMS,
W71-10313 05C

RHODE ISLAND UNIV., KINGSTON. NARRAGANSETT MARINE LAB.
PHOSPHATE ADSORPTION BY KAOLIN IN SALINE ENVIRONMENTS,
W71-10207 05C

RICE UNIV., HOUSTON, TEX.
SIZE ANALYSIS OF SILT AND CLAY BY HYDROPHOTOMETER,
W71-10332 02J

RICHMOND UNIV., VA. DEPT. OF BIOLOGY.
EFFECTS OF ZOOPLANKTON ON PHOTOSYNTHESIS BY ALGAE IN LAKES,
W71-10098 05C

RIJKSWATERSTRAAT, VOORBURG (NETHERLANDS).
DESIGN LEVELS IN THE TRANSITION ZONE BETWEEN THE TIDAL REACH AND THE RIVER REGIME REACH,
W71-10039 08B

ROAD RESEARCH LAB., CROWTHORNE (ENGLAND).
THE MINERALOGY OF TROPICAL WEATHERING ILLUSTRATED BY SOME WEST MALAYSIAN SOILS,
W71-10031 02G

ROBERT A. TAFT SANITARY ENGINEERING CENTER, CINCINNATI, OHIO.
SOIL CHEMICAL CHANGES AND INFILTRATION RATE REDUCTION UNDER SEWAGE SPREADING,
W71-10108 05B

ROHM AND HAAS CO., SPRINGHOUSE, PA., RESEARCH LABS.
IDENTIFICATION OF METABOLITES OF N - (1, 1-DIMETHYLPROPYNYL) - 3,5 DICHLORBENZAMINE IN RAT AND COW URINE AND RAT FECES,
W71-10356 05A

RUTGERS UNIV., NEW BRUNSWICK, N.J. DEPT OF CHEMICAL ENGINEERING.
PROCESS CONTROL MODEL FOR OXYGEN REGENERATION OF POLLUTED RIVERS, PHASE II,
W71-10162 05G

SCRIPPS INSTITUTION OF OCEANOGRAPHY, SAN DIEGO, CALIF.
CHANNEL PIRACY ON MONTEREY DEEP-SEA FAN,
W71-09947 02J

SOUTH DAKOTA STATE UNIV., BROOKINGS. DEPT. OF CIVIL ENGINEERING.
POLLUTION POTENTIAL OF LIVESTOCK FEEDING OPERATIONS IN SOUTH DAKOTA,
W71-10104 05D

SOUTHAMPTON UNIV. (ENGLAND). DEPT. OF CIVIL ENGINEERING.
FLOW OVER TRIANGULAR ELEMENTS SIMULATING DUNES,
W71-10173 08B

SOUTHERN METHODIST UNIV., DALLAS, TEX. DEPT. OF GEOLOGICAL SCIENCES.

STREAM BANK FAILURE AND ROTATIONAL SLUMPING PRESERVATION AND SIGNIFICANCE IN THE GEOLOGIC RECORD,
W71-10334 02J

STANFORD UNIV., CALIF.
DECISION THEORY APPLIED TO SETTLEMENT PREDICTIONS,
W71-10406 08D

STATE HYDROLOGICAL INST., LENINGRAD (USSR).
MORPHOLOGICAL CHARACTERISTICS OF BRAIDED RIVER CHANNELS IN AN AREA OF TRIBUTARY INFLOW (K VOPROSU O MORFOLOGICHESKIKH OSOBENNOSTYAKH MNOGORUKAVNYKH RECHNYKH RUSEL NA UCHASTKE VPADENIYA PRITOKA),
W71-10343 02J

STATE OCEANOGRAPHIC INST., MOSCOW (USSR).
THE REGULARITIES OF THE HYDROCHEMICAL REGIME FORMATION IN THE RIVER MOUTHS,
W71-10046 02K

STATE WATER COMMITTEE, BUCHAREST (ROMANIA).
INTERACTION OF PHREATIC WATER AND SURFACE WATER IN THE DANUBE DELTA (FRENCH INTERACTION DES EAUX PHREATIQUES ET DES EAUX DE SURFACE DANS LE DELTA DU DANUBE),
W71-10055 02F

STORM ENGINEERING DESIGN, SAN RAFAEL, CALIF.
MANAGEMENT STUDY OF A TRANSITIONAL DELTA SYSTEM,
W71-10057 04A

SZKOLA GLOWNA GOSPODARSTWA WIEJSKIEGO, WARSAW (POLAND). DEPT. OF ZOOLOGY.
HATCHABILITY OF EGGS OF TRIOPS CANCRIFORMIS (BOSC) IN SOLUTION OF CHLORIDES AND SULFATES,
W71-09991 05C

TERRAMETRICS, INC., GOLDEN, COLO.
THE MEASUREMENT OF ROCK STRESS CHANGES USING HYDRAULIC BOREHOLE GAGES,
W71-10408 08E

TEXAS TECNOLOGICAL COLL., LUBBOCK. DEPT OF AGRICULTURAL ECONOMICS.
ECONOMICS OF WATER POLLUTION CONTROL FOR CATTLE FEEDLOT OPERATIONS,
W71-10377 05G

TEXAS WATER DEVELOPMENT BOARD, AUSTIN.
RECURRING TEXAS DROUGHTS,
W71-10410 07C

TIPPETTS-ABBETT-MCCARTHY-STRATTON, NEW YORK AND BROOKLYN COLL., NEW YORK. DEPT. OF GEOLOGY.
NONDESTRUCTIVE WATER CONTENT DETERMINATION,
W71-10338 02G

TRANSCAUCASIAN SCIENTIFIC HYDROMETEOROLOGICAL RESEARCH INST., BAKU (USSR). SEA LAB.
METHODS OF INVESTIGATION OF SEDIMENT DYNAMICS OF RIVER ESTUARIES,
W71-10045 02L

UNDERWOOD MCLELLAN AND ASSOCIATES LTD., WINNIPEG (MANITOBA).
STOCHASTIC ANALYSIS OF PERIODIC HYDROLOGIC PROCESS,
W71-10172 02A

UNION CARBIDE CORP., TUXEDO, N.Y. STERLING FOREST RESEARCH CENTER.
NEUTRON INELASTIC SCATTERING INVESTIGATION OF WATER AND IONIC SOLUTIONS,
W71-09974 01B

UNIT OF SOIL PHYSICS. AGRICULTURAL RESEARCH COUNCIL, CAMBRIDGE (ENGLAND).
OPTIMUM PUMPING CONDITIONS FOR WELLS LOCATED IN UNCONFINED COASTAL AQUIFERS,
W71-10017 04B

UNIVERSAL OIL PRODUCTS CO., ST. PAUL, MINN. JOHNSON DIV.
SHOOTING ROCK WELL INVOLVES RISKS.
W71-10419 04B

BEST WELL DEPTH IN CRYSTALLINE ROCKS,
W71-10420 08A

WELL TECHNOLOGY SERVES THE MINING INDUSTRY.
W71-10423 04B

RESEARCH IS GUIDE FOR ESTIMATING WELL COSTS.
W71-10424 08A

PIPE AND CASING IN WATER-WELL DRILLING.
W71-10425 08A

CHECKING ALIGNMENT AND PLUMBNESS OF WELLS.
W71-10429 08A

DISINFECTING WELLS AND WATER PIPING.
W71-10431 08A

METALS THAT RESIST CORROSION SAVE MONEY.
W71-10433 04B

CHARTS SHOW AIR-LIFT PERFORMANCE.
W71-10434 08A

UNIVERSITY COLL. OF NORTH WALES, BANGOR. MARINE SCIENCE LABS.
TIME VARIATION OF THE DEPTH OF A HIGH SALINITY LAYER IN THE CELTIC SEA,
W71-09949 02K

UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES. DEPT. OF BIOLOGICAL SCIENCES.
TAXONOMIC GUIDES TO ARCTIC ZOOPLANKTON (II) (MEDUSAE OF THE CENTRAL ARCTIC, SIPHONOPHORES OF THE CENTRAL ARCTIC, CTENOPHORES OF THE CENTRAL ARCTIC),
W71-10082 05C

UTAH DEPT. OF NATURAL RESOURCES, SALT LAKE CITY. DIV. OF OIL AND GAS CONSERVATION.
GENERAL RULES AND REGULATIONS RELATING TO WELLS.
W71-10260 06E

UTAH WATER RESEARCH LAB., LOGAN.
QUANTITY AND CHEMICAL QUALITY OF RETURN FLOW,
W71-09936 05B

U. S. NATIONAL COMMITTEE OF THE IHD (NAS-NRC), WASHINGTON, D.C.
HYDROLOGICAL MAPPING AND THE IHD,
W71-10030 07C

U.S. ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
STABILITY OF PROPOSED BREAKWATER, BURNS WATERWAY HARBOR, INDIANA HYDRAULIC MODEL INVESTIGATION,
W71-10007 08B

VIRGINIA INST. OF MARINE SCIENCE, GLOUCESTER POINT.
TREATMENT OF SHELL CULTCH WITH POLYSTREAM TO INCREASE THE YIELD OF SEED OYSTERS, CRASSOSTREA VIRGINICA,
W71-10208 05B

VIRGINIA MILITARY INST., LEXINGTON. DEPT. OF CIVIL ENGINEERING AND WISCONSIN UNIV., MADISON. DEPT. OF CIVIL ENGINEERING.
JUNCTION LOSSES IN LAMINAR AND TRANSITIONAL FLOWS,
W71-10178 08B

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG. DEPT. OF GEOLOGICAL SCIENCES AND OKLAHOMA UNIV., NORMAN. SCHOOL OF GEOLOGY AND GEOPHYSICS.
DURABILITIES OF SAND SIZE SCHIST AND 'VOLCANIC' ROCK FRAGMENTS DURING FLUVIAL TRANSPORT, ELK CREEK, BLACK HILLS, SOUTH DAKOTA,
W71-10329 02J

VIRGINIA POLYTECHNIC INST., BLACKSBURG. DEPT. OF BIOLOGY.
REDUCTION AND RESTORATION OF THE NUMBER OF FRESH-WATER PROTOZOAN SPECIES FOLLOWING ACUTE EXPOSURE TO COPPER AND ZINC,
W71-09987 05C

VIRGINIA, UNIV., CHARLOTTESVILLE. DEPT. OF ENVIRONMENTAL SCIENCES.
SIMULATION MODEL OF STREAM CAPTURE,
W71-10337 02E

VSESOYUZNYI NAUCHNO-ISSLEDOVATELSKII INSTITUT MINERALNOGO SYRYA, MOSCOW (USSR).
GEOCHEMISTRY OF ALUMINUM DURING INTENSIVE HYDROLYTIC DECOMPOSITION OF ALUMINOSILICATES IN WEATHERING CRUSTS (K GEOKHIMII ALYUMINIYA V ZONE ENERGICHNOGO GIDROLITICHESKOGO RAZLOZHENIYA ALYUMOSILIKATOV V KORAKH VYVETRIVANIYA).
W71-10341 02K

WARSAW UNIV. (POLAND). CHAIR OF HYDROBIOLOGY.
THE FOOD SOURCES OF LAKE ZOOPLANKTON (IN POLISH),
W71-10094 05C

WASHINGTON DEPT. OF ECOLOGY, OLYMPIA.
WATER POLLUTION CONTROL LAWS.
W71-10117 05G

WASHINGTON UNIV., SEATTLE. CHARLES W. HARRIS HYDRAULICS LAB.
VERTICAL RECHARGE OF UNCONFINED AQUIFER,
W71-10176 02G

WASHINGTON UNIV., SEATTLE. FISHERIES RESEARCH INST.
BUILDING AND OPERATING A FLOATING LABORATORY,
W71-09986 09C

WASHINGTON UNIV., SEATTLE. LAB. OF RADIATION ECOLOGY.
MERCURY IN SELECTED FISH PROTEIN CONCENTRATES,
W71-10206 05C

WATER POLLUTION RESEARCH LAB., STEVENAGE (ENGLAND).
COPPER/BICARBONATE EQUILIBRIA IN SOLUTIONS OF BICARBONATE ION AT CONCENTRATIONS SIMILAR TO THOSE FOUND IN NATURAL WATER,
W71-10323 05A

WATER RESOURCES ENGINEERS, INC., WALNUT CREEK, CALIF.
WATER QUALITY MODELING OF ESTUARIES,
W71-10047 05G

WEATHER BUREAU, EL PASO, TEX AND TEXAS UNIV., EL PASO. DEPT. OF CIVIL ENGINEERING.
A TECHNIQUE FOR MEASURING RAINFALL POTENTIAL,
W71-10319 02B

WEST VIRGINIA UNIV., MORGANTOWN.
THEORETICAL ANALYSIS OF THE EFFECTS OF AIR VOIDS IN CONCRETE,
W71-10381 08F

WESTERN CANADA HYDRAULIC LABS. LTD. (BRITISH COLUMBIA).
MODEL STUDY OF POWER INTAKE GATE OF MOSSYROCK DAM,
W71-10168 08C

WESTERN CO., RICHARDSON, TEX.
BLAST-FRACTURING,
W71-10418 08A

WICHITA WATER DEPARTMENT, KANS.
MAINTENANCE OF WELL EFFICIENCY,
W71-10432 08A

WILSON INDUSTRIES INC., HOUSTON, TEX. OIL CONTAINMENT DIV.
LIGHTWEIGHT LOW TENSION BARRIER SYSTEM. PART I,
W71-10165 05G

HEAVY-DUTY OIL CONTAINMENT SYSTEM, PNEUMATIC BARRIER SYSTEM. PART I,
W71-10166 05G

WISCONSIN NATURAL RESOURCES BOARD, MADISON.
SOLID WASTE DISPOSAL STANDARDS.
W71-10114 05G

WISCONSIN UNIV., MADISON. DEPT. OF SOILS.
EFFECT OF MANURE APPLICATION, AERATION, AND SOIL PH ON SOIL NITROGEN TRANSFORMATIONS AND ON CERTAIN SOIL TEST VALUES,
W71-10357 05D

WORTH WELL SURVEYS, INC., MIDLAND, TEX.
TEMPERATURE SURVEYS THE ART OF INTERPRETATION,
W71-10427 03B

WYOMING DEPT. OF PUBLIC HEALTH.
WATER QUALITY STANDARDS FOR INTERSTATE WATERS IN WYOMING.
W71-10214 05G

ACCESSION NUMBER INDEX

06B	W71-09932
06E	W71-09933
06E	W71-09934
06E	W71-09935
05B	W71-09936
06B	W71-09937
06A	W71-09938
06E	W71-09939
06B	W71-09940
05B	W71-09941
05B	W71-09942
02J	W71-09943
06B	W71-09944
04A	W71-09945
05B	W71-09946
02J	W71-09947
02K	W71-09948
02K	W71-09949
02J	W71-09950
06B	W71-09951
05B	W71-09952
05B	W71-09953
05B	W71-09954
05B	W71-09955
05A	W71-09956
05B	W71-09957
05B	W71-09958
05B	W71-09959
05B	W71-09960
05B	W71-09961
02C	W71-09962
02F	W71-09963
02J	W71-09964
02J	W71-09965
02J	W71-09966
02J	W71-09967
02J	W71-09968
02J	W71-09969
02J	W71-09970
02J	W71-09971
04A	W71-09972
04A	W71-09973
01B	W71-09974
03A	W71-09975
03A	W71-09976
03A	W71-09977
03A	W71-09978
06E	W71-09979
05C	W71-09980
05C	W71-09981
05A	W71-09982
06E	W71-09983
05A	W71-09984
05C	W71-09985
09C	W71-09986
05C	W71-09987
06E	W71-09988
05C	W71-09989
05C	W71-09990
05C	W71-09991
05C	W71-09992
05C	W71-09993
05A	W71-09994
05A	W71-09995
05A	W71-09996
05A	W71-09997
08B	W71-09998
08B	W71-09999
08B	W71-10000
08B	W71-10001
08B	W71-10002
08B	W71-10003
08B	W71-10004
08B	W71-10005
08B	W71-10006
08B	W71-10007
08B	W71-10008
08B	W71-10009
07C	W71-10010
02G	W71-10011
02G	W71-10012
02D	W71-10013
02A	W71-10014
02B	W71-10015
02G	W71-10016
04B	W71-10017
02E	W71-10018
02F	W71-10019
02A	W71-10020
02A	W71-10021
02E	W71-10022
02B	W71-10023
02F	W71-10024
02F	W71-10025
03B	W71-10026
02A	W71-10027
02A	W71-10028
02E	W71-10029
07C	W71-10030
02G	W71-10031
08D	W71-10032
02B	W71-10033
02J	W71-10034
05B	W71-10035
05C	W71-10036
07C	W71-10037
02E	W71-10038
08B	W71-10039
02E	W71-10040
02E	W71-10041
02C	W71-10042
02J	W71-10043
02J	W71-10044
02L	W71-10045
02K	W71-10046
05G	W71-10047
02C	W71-10048
02C	W71-10049
02L	W71-10050
02F	W71-10051
02F	W71-10052
02F	W71-10053
05B	W71-10054
02F	W71-10055
08B	W71-10056
04A	W71-10057
08B	W71-10058
08B	W71-10059
08B	W71-10060
08B	W71-10061
05C	W71-10062
05C	W71-10063
05C	W71-10064
05C	W71-10065
05C	W71-10066
06E	W71-10067
06E	W71-10068
05C	W71-10069
05C	W71-10070
06E	W71-10071
07B	W71-10072
06E	W71-10073
06E	W71-10074
05C	W71-10075
06B	W71-10076
07B	W71-10077
06E	W71-10078
05C	W71-10079
05C	W71-10080
06E	W71-10081
05C	W71-10082
05C	W71-10083
05C	W71-10084
06E	W71-10085
05C	W71-10086
05C	W71-10087
05C	W71-10088
07B	W71-10089
05C	W71-10090
05C	W71-10091
05A	W71-10092
05B	W71-10093
05C	W71-10094
05C	W71-10095
05C	W71-10096
06E	W71-10097
05C	W71-10098
05C	W71-10099
05A	W71-10100
05A	W71-10101
05A	W71-10102
05C	W71-10103
05D	W71-10104
05C	W71-10105
05D	W71-10106
05B	W71-10107
05B	W71-10108
05A	W71-10109
05A	W71-10110
05G	W71-10111
05G	W71-10112
05G	W71-10113
05G	W71-10114
05G	W71-10115
05G	W71-10116
05G	W71-10117
05G	W71-10118
05G	W71-10119
06E	W71-10120
06E	W71-10121
06E	W71-10122
06E	W71-10123
06E	W71-10124
06E	W71-10125
06E	W71-10126
06E	W71-10127
06E	W71-10128
06E	W71-10129
06E	W71-10130
06E	W71-10131
06E	W71-10132
06E	W71-10133
06E	W71-10134
06E	W71-10135
06E	W71-10136
06E	W71-10137
06E	W71-10138
06E	W71-10139
06E	W71-10140
06E	W71-10141
06E	W71-10142
06E	W71-10143
06E	W71-10144
06E	W71-10145
06E	W71-10146
06E	W71-10147
06E	W71-10148
06E	W71-10149
06E	W71-10150
06E	W71-10151
06E	W71-10152
06E	W71-10153
06E	W71-10154
06E	W71-10155
06E	W71-10156
05G	W71-10157
05G	W71-10158
05G	W71-10159
05G	W71-10160
05G	W71-10161
05G	W71-10162
02F	W71-10163
05G	W71-10164
05G	W71-10165
05G	W71-10166
05G	W71-10167
08C	W71-10168
02J	W71-10169
02E	W71-10170
08B	W71-10171
02A	W71-10172
08B	W71-10173
08B	W71-10174
08A	W71-10175
02G	W71-10176
08B	W71-10177
08B	W71-10178
03B	W71-10179
04A	W71-10180
04A	W71-10181
04A	W71-10182
04A	W71-10183
04A	W71-10184
02E	W71-10185
02H	W71-10186
02D	W71-10187
02D	W71-10188
02E	W71-10189
05B	W71-10190
05B	W71-10191
05B	W71-10192
05B	W71-10193
05B	W71-10194
05B	W71-10195
05B	W71-10196
06E	W71-10197
06E	W71-10198
08B	W71-10199
05G	W71-10200
08D	W71-10201
05G	W71-10202
06E	W71-10203
06E	W71-10204
06E	W71-10205
05C	W71-10206
05C	W71-10207
05B	W71-10208
05C	W71-10209
07C	W71-10210
05C	W71-10211
05C	W71-10212
05C	W71-10213
05G	W71-10214
06E	W71-10215
06E	W71-10216
06E	W71-10217
06E	W71-10218
06E	W71-10219
06E	W71-10220
06E	W71-10221
06E	W71-10222
06E	W71-10223

ABSTRACT SOURCES

Source	Accession Number	Total
A. Center of Competence		
U.S. Geological Survey, Hydrology	W71-09945--09973 10010--10061 10168--10189 10313--10354 09941--09943	147
University of Arizona, Arid Land Water Resources	W71-10413--10417 10410	6
University of Wisconsin, Eutrophication	W71-10062--10066 10069--10070 10075--10077 10079--10080 10082--10084 10086--10096 10072, 10098	28
Bureau of Reclamation, Engineering Works	W71-10379--10384 10389--10395 10401--10409 10387, 10397	24
University of Washington, Water Quality Requirements for Aquatic Organisms	W71-09980--09982 09984--09987 09989--09997 10206--10213	24
Iowa State University, Agricultural Livestock Wastes	W71-10099--10102 10105--10111 10355--10359 10362--10377	31
National Water Well Association, Water Well Construction Technology	W71-10418--10425 10427--10429 10431--10434	14
University of Florida, Eastern U.S. Water Law	W71-10112--10161 10214--10312 10435--10449 09979, 09983 09988, 10067 10068, 10071 10073, 10074 10078, 10081 10085, 10097 10197, 10198 10203, 10204 10205, 10360 10361, 09939 09933, 09934 10167	187

☆ U.S. GOVERNMENT PRINTING OFFICE : 1971 O-LT - 481-632 (5)

CENTERS OF COMPETENCE AND THEIR SUBJECT COVERAGE

- Ground and surface water hydrology at the Water Resources Division of the U. S. Geological Survey, U. S. Department of the Interior.
- Metropolitan water resources management at the Center for Urban Studies of the University of Chicago.
- Eastern United States water law at the College of Law of the University of Florida.
- Policy models of water resources systems at the Department of Water Resources Engineering of Cornell University.
- Water resources economics at the Water Resources Research Institute of Rutgers University.
- Design and construction of hydraulic structures; weather modification; and evaporation control at the Bureau of Reclamation, Denver, Colorado.
- Eutrophication at the Water Resources Center of the University of Wisconsin, jointly sponsored by the EPA-Water Quality Office, Soap and Detergent Association, and the Agricultural Research Service.
- Water resources of arid lands at the Office of Arid Lands Studies of the University of Arizona.
- Water well construction technology at the National Water Well Association.
- Water-related aspects of nuclear radiation and safety at the Oak Ridge National Laboratory.

Supported by the Environmental Protection Agency in cooperation with WRSIC.

- Thermal pollution at the Department of Sanitary and Water Resources Engineering of Vanderbilt University.
- Textile wastes pollution at the School of Textiles of North Carolina State University.
- Water quality requirements for freshwater and marine organisms at the College of Fisheries of the University of Washington.
- Wastewater treatment and management at the Center for Research in Water Resources of the University of Texas.
- Agricultural livestock wastes at the Department of Agricultural Engineering of Iowa State University.
- Methods for chemical and biological identification and measurement of pollutants at the Analytical Quality Control Laboratory of the Water Quality Office of the Environmental Protection Agency.
- Coastal pollution at the Oceanic Research Institute.
- Water treatment plant waste pollution control at American Water Works Association Research Foundation.

Subject Fields

- NATURE OF WATER
- WATER CYCLE
- WATER SUPPLY AUGMENTATION AND CONSERVATION
- WATER QUANTITY MANAGEMENT AND CONTROL
- WATER QUALITY MANAGEMENT AND PROTECTION
- WATER RESOURCES PLANNING
- RESOURCES DATA
- ENGINEERING WORKS
- MANPOWER, GRANTS, AND FACILITIES
- SCIENTIFIC AND TECHNICAL INFORMATION

INDEXES

- SUBJECT INDEX
- AUTHOR INDEX
- ORGANIZATIONAL INDEX
- ACCESSION NUMBER INDEX
- ABSTRACT SOURCES

U.S.MAIL

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF COMMERCE

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
Springfield, Va. 22151

OFFICIAL BUSINESS

PRINTED MATTER